Cobb Seamount Species Inventory

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Canadian Technical Report of Fisheries and Aquatic Sciences 3122

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Canadian Technical Report of Fisheries and Aquatic Sciences

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Canadian Technical Report of
Fisheries and Aquatic Sciences 3122

2015

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By

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Cat. No. Fs97-6/3122E IBSN 978-1-100-25682-5 ISSN 1488-5379
Cat. No. Fs97-6/3122E-PDF IBSN 978-1-100-25683-2

Correct citation for this publication:

Du Preez, C., Curtis, J.M.R., Davies, S.C., Clarke, M.E., and Fruh, E.L. 2015. Cobb Seamount species inventory. Can. Tech. Rep. Fish. Aquat. Sci. 3122: viii + 108 p.

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Abstract

Du Preez, C., Curtis, J.M.R., Davies, S.C., Clarke, M.E., and Fruh, E.L. 2015. Cobb Seamount species inventory. Can. Tech. Rep. Fish. Aquat. Sci. 3122: viii + 108 p.

Cobb Seamount is an isolated biodiversity hotspot located within the international waters of the Northeast Pacific Ocean. In 2012, Fisheries and Oceans Canada (DFO) led an expedition (DFO Science Cruise Number PAC 2012-43) with the National Oceanic and Atmospheric Administration (NOAA) to survey the benthic communities of Cobb Seamount. The main objectives were to identify the type and location of vulnerable marine ecosystem (VME) components and document evidence of fishery interactions, to inform international fishing agreements. This report summarises observations of species occurrences made from the seafloor imagery collected during the 2012 cruise. The purpose of this report is to provide a comprehensive species inventory and photographic documentation of the benthic and mid-water communities observed on Cobb Seamount. It summarizes the 144 taxa from 11 phyla observed between 35 and 1154 m depth during the 2012 cruise and lists all 267 benthic and mid-water taxa from 14 phyla now known to occur on Cobb Seamount. Seventeen coral taxa observed were on the North Pacific Fisheries Commission's list of indicators of potential vulnerable marine ecosystems (VMEs).

Résumé

Du Preez, C., Curtis, J.M.R., Davies, S.C., Clarke, M.E., et Fruh, E.L. 2015. Inventaire des espèces au mont sous-marin Cobb. Rapp. tech. can. sci. halieut. aquat. 3122: viii + 108 p.

Le mont sous-marin Cobb est un point névralgique de biodiversité isolé, situé dans les eaux internationales du Nord-Est de l'océan Pacifique. En 2012, Pêches et Océans Canada (MPO) a mené une expédition (croisière des Sciences du MPO n° PAC 2012-43) en compagnie de la National Oceanic and Atmospheric Administration (NOAA) afin d'effectuer des relevés des communautés benthiques du mont sous-marin Cobb. Les objectifs principaux étaient d'identifier les types de composantes d'écosystèmes marins vulnérables (EMV) ainsi que leur emplacement, et de répertorier les preuves d'interactions avec les pêches pour servir de base aux ententes de pêche internationales. Ce rapport résume les observations de la présence d'espèces grâce à des images des fonds marins recueillies pendant la croisière en 2012. Le rapport a pour objet de faire l'inventaire complet ainsi que fournir des photographies des communautés benthiques et semi-pélagiques observées sur le mont sous-marin Cobb. Il résume les 144 taxons de 11 divisions observés entre 35 et 1 154 m de profondeur pendant la croisière de 2012 et dresse la liste de tous les 267 taxons benthiques et semi-pélagiques des 14 divisions connues au mont sous-marin Cobb. Dix-sept taxons de coraux observés figurent sur la liste des indicateurs d'EMV potentiels de la Commission des pêches du Pacifique.

Most cléfs: mont sous-marin Cobb, espèces, inventaire, taxonomie, mer profonde, exploration, véhicule télécommandé, véhicule sous-marin autonome, image, sébaste, corail, eponges

Introduction

Cobb Seamount is a 27 million-year-old submarine basalt volcano (Budinger 1967) located in the Northeast Pacific Ocean approximately 500 km west-southwest of British Columbia, Canada (46° 44.4' N, 130° 48' W; Fig. 1). It is part of the Cobb-Eickelberg Seamount chain created by the Cobb hotspot (Davis & Karsten 1986). The terraced flanks of the seamount rise 3000 m to a central pinnacle at 24 m depth (Parker & Tunnicliffe 1994). The pinnacle and shallowest of terraces extend well into light-penetrating depths – an unusual feature for seamounts in the northeast Pacific Ocean. The availability of hard substrata in the photic zone makes Cobb Seamount a biodiversity hotspot amid the extensive Cascadia Basin (Fig. 2).

Since its discovery by the M.V. *John N. Cobb* in 1950 (U.S. Fish and Wildlife Service) Cobb Seamount has received attention from many fields of ocean science and from the fishing industries of at least a few nations. In the early 1950s the first oceanographic observations of Cobb Seamount were made (Paquette et al. 1954; Barnes and Paquette 1957). Subsequent expeditions in 1956 produced the first detailed description of the physiography of Cobb Seamount (Budinger & Enbysk 1960; Budinger 1967). In the mid-1960s SCUBA divers made shallow underwater observations (Spencer et al. 1969) and in 1971 Birkeland produced a species list from shallow *in-situ* observations and photographs. In the early 1980s researchers aboard the Canadian operated submersible *Pisces IV* made diver observations, and collected photographs and voucher specimens from depths of up to 700 m (Farrow & Durant 1985). In 1990 scientists dredged the top of the seamount (University of Washington, School of Oceanography). These combined observations and collections are represented in a comprehensive list of species known to occur shallower than 200 m on Cobb Seamount (Parker & Tunnicliffe 1994).

Cobb Seamount is located in international waters. It is unclear when commercial vessels first started fishing Cobb Seamount but reports of trawling and seamount fisheries in the region date back to the 1960s (Douglas 2011). The first Cobb Seamount specific catch data were reported by Japanese fishers in 1970 and detailed large catches of rockfish (*Sebastes* spp.; Douglas 2011). In more recent years Oregon-based fisheries have targeted Widow rockfish (*Sebastes entomelas*) and sablefish (*Anoplopoma fimbria*; Douglas 2011) and a Canadian sablefish fishery was established (Furness et al. 2010). Fishing practices at Cobb Seamount are known to have included bottom and mid-water trawling, longlining, fish pots, and gillnets (Douglas 2011; Curtis et al. 2015). It is likely that other nations have fished Cobb Seamount but no data were available (Douglas 2011). The shallow depth and lack of enforceable international regulations make benthic and mid-water communities on seamounts particularly vulnerable to overexploitation (Rowden et al. 2010).

A new regional fisheries management organization, the North Pacific Fisheries Commission, is in the process of becoming established to implement the Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean. Among priorities identified by member countries and fishing entities are the need to identify and protect vulnerable marine ecosystems (VMEs). Data on species occurrences and distributions will help inform decisions related to fishery management in the convention area, which includes Cobb Seamount.

In July 2012 Fisheries and Oceans Canada (DFO) and the National Oceanic and Atmospheric Administration (NOAA) completed a 6 day survey of Cobb Seamount (DFO Science Cruise Number PAC 2012-43). The 2012 cruise objectives were as follows[1,2]:

1. identify VMEs to inform decisions on international fishing agreements;
2. survey benthic communities using submersible vehicles (from 1500 m depth to pinnacle);
3. survey pelagic communities en-route to and from, and on Cobb Seamount using hydroacoustics;
4. survey seabird and marine mammal communities en-route to and from, and on Cobb Seamount using visual surveys;
5. collect oceanographic data using CTD instruments on the submersible vehicles;
6. and document evidence of fishery interactions to inform international fishing agreements and develop encounter protocols.

This report summarises the diversity of benthic and mid-water taxa observed from the seafloor imagery of Cobb Seamount collected during the 2012 cruise. It documents the 146 taxa from 11 phyla observed during the 2012 cruise, 71 of which are new records (organisms previously unknown to occur on Cobb Seamount). With the addition of the 123 taxa not observed in 2012 but previously observed or collected (Table 3) the total number of benthic and mid-water taxa now known to occur on Cobb Seamount stands at 269. This is the first photograph documented species inventory for Cobb Seamount and it covers depths from which there have previously been no biological observations. It may be necessary to revise this report in the future as we gain new knowledge of Cobb Seamount. In a companion report, Curtis et al. (2015) provide descriptions of the survey design, benthic community structure, fishery interactions, analyses of hydroacoustic, seabird and marine mammal surveys, and a summary of oceanographic data.

Methods and Materials

One of the major objectives of the joint DFO-NOAA Cobb Seamount 2012 cruise was to survey the benthic communities on Cobb Seamount from the pinnacle to 1500 m depth with still photography and video transects. Three submersibles were used: two remotely operated vehicles (ROVs) and an autonomous underwater vehicle (AUV). The operation of one ROV was led by the DFO Shellfish Section based at the Pacific Biological Station and the other by the Fisheries Science and Management Research Group at Simon Fraser University (SFU). The AUV was operated by NOAA. Each submersible had its own depth range and imagery-collection capabilities (see also Curtis et al. 2015).

The DFO ROV was a customized Deep Ocean Engineering Phantom HD2+2. Survey imagery was collected using a still camera (C-MAP Systems Cyclops) and a high definition (HD) video camera (Insite Pacific Inc. Mini Zeus). Both cameras were mounted to movable fixtures on the front of the ROV and each was fitted with a pair of parallel lasers (a projected scale within the camera's field of view aides in sizing organisms for identification). During surveying the ROV flew near the seafloor (0.5 to 1.5 meters above) at a speed of approximately 0.2 to 0.5 knots. Digital still photographs were automatically taken every 15 seconds and video was continuously recorded. Manual

[1] http://public.waterproperties.ca/cruiseplanview.php?cruiseid=2012-43
[2] http://public.waterproperties.ca/cruisereportview.php?cruiseid=2012-43

photographs were also taken to photo-document organisms or other features of interest. Some voucher specimens were collected with a rotating arm, clamp and collection bag.

The ROV operated by SFU was also a customized Deep Ocean Engineering Phantom HD2+2. Its components and umbilical cord allowed the vehicle to dive to a depth of 550 m. The stock standard definition (SD) video camera had two coloured lasers to provide a 10 cm reference scale, however, these were not used during transects due to technical issues. This ROV was not equipped with a still camera. During surveying the ROV flew near the seafloor (0.5 to 1.5 meters above) at a speed of approximately 0.2 to 0.5 knots.

The AUV used was a SeaBED designed by engineers at Woods Hole Oceanographic Institution and operated by the NOAA Northwest Fisheries Science Center (NWFSC) and the Pacific Islands Fisheries Science Center (PIFSC). Survey imagery was collected using stereo still cameras mounted perpendicular (downward-facing) and from a forward-angled camera on the AUV (only used to aid in identification). During surveying the AUV was programmed to maintain a height of approximately 3 m above the seafloor and to take a photograph every 10 seconds. Cameras were synchronized with a camera strobe. For additional AUV information see Clarke et al. (2010).

The submersibles were launched from the research vessel CCGS *John P. Tully* on 23 dives to 20 sites over 6 days (between July 21st and July 26th 2012; Curtis et al. 2015). The objective of each dive was to complete one survey transect, however, due to technical issues, images were obtained from 19 sites and only 18 transects were completed. The average DFO ROV transect length was 570 m (Fig. 3), the average SFU ROV transect was 569 m (Fig. 4), and the average AUV transect length was 1800 m (Table 1; Fig. 5). In total the 19 dives surveyed 15 km of seafloor between 35 and 1154 m depth. Transect depths, lengths, and durations varied between submersibles and between dives (Table 1; Fig. 6). With the exception of a small area (approximately 100 – 200 m^2) at site SFU_2 (364-373 m depth), there is a gap in the depth range surveyed in 2012 between 259 and 433 m (Fig. 6).

This inventory list along with details on locations and depth ranges were compiled from the DFO ROV HD video and digital still photographs, the SFU ROV SD video, and the AUV digital still photographs, primarily those from the downward port side camera. The resolution of the ROV photographs and the proximity of the camera to the seafloor enabled small sessile and sedentary taxa (centimetre scale) to be identified while the wider-scope ROV video and AUV photographs provided imagery of larger mobile macrofauna (fauna >10 cm). The SD video of the SFU ROV rendered species identification more challenging.

All video and still photographs from the two ROVs and AUV were viewed by the experts aboard the cruise (see Expedition Participants, below) in real time and following retrieval of vehicles to compile preliminary lists of observed species. Following the cruise, Du Preez systematically annotated approximately 11 hours of DFO ROV HD video and a subset (2060, representing approximately half) of the digital still photographs from each DFO transect to record details including all species occurrences and relative abundance, habitat type, and image quality using Video Miner (version 2.1.4) following the protocol outlined in the Video Miner Short Manual (version 2.1.2.0) and as outlined in Curtis et al. (2015). In addition, Du Preez systematically annotated a subset of the AUV digital still photographs (every 2-3, totally 6050 photos) to record occurrences of coral and sponge taxa only, as well as substrate type and image quality (as described in Curtis et al.

2015). Fruh also annotated all of the AUV photos and recorded occurrences and counts of all identifiable taxa (except snails and brittle stars) providing opportunities to cross-reference species identifications. The SD video collected with the SFU ROV is lower quality and was not quantitatively annotated. Curtis viewed the video from two SFU ROV transects, SFU_3 and SFU_5, and a limited amount of video collected from the incomplete SFU_2 transect to record species occurrences and corresponding depth ranges (Fig. 4). Sample photos and video clips from the SFU dives were reviewed by Du Preez to confirm species identifications. Finally, all the remaining DFO ROV HD video and digital still photographs, and the AUV digital still photographs were viewed by Du Preez and Curtis to identify any other organisms present on Cobb Seamount that were not already recorded in the image analyses described above. Species identifications were also cross-referenced with cruise records made by Curtis, Clarke, Davies, de Moura Neves, Du Preez, Fruh, Laidig, Martin, Taylor, and Yoklavich (see Expedition Participants), and updated through personal communications with Verena Tunnicliffe and Henry Reiswig.

Fauna were identified to the lowest taxonomic level possible with confidence. The inability to identify to species-level did occur for various reasons including: an unknown organism (possibly a new species), the life stage of the organism (i.e. too small to resolve distinguishing features or obscure juvenile morphology), poor image quality (i.e. distance, camera angle, water visibility, etc.), and cryptic species. Throughout the image analysis copies of the photographs and snapshots of the video were collected to photo-document species identification and to include in the species inventory. Only organisms that were clearly identifiable were noted in this report. Photographs have been included whenever possible, as video stills can appear blurry despite the clarity of the video. Many primary and secondary resources were used to confirm taxonomic identification (see References and Additional Resources). The World Register of Marine Species (WoRMS) was used for nearly all nomenclature and taxonomic authorities (accessed February 2014 and June 2014); in a few cases taxonomic experts advised the use of different nomenclatures.

Species Inventory Format

This species inventory was developed to facilitate species identification and document species observations from the Cobb Seamount 2012 cruise. It provides images, taxonomy, scientific and common names, the taxonomic authority, a level of identification confidence, and the transect(s) and depth range at which the organism was observed, as well as additional notes including pertinent information and relevant references. An example of the inventory format is provided in Table 2.

Taxonomy
The organisms in this inventory are presented in taxonomic order, starting with Phylum Ochrophyta (brown algae) and ending with Phylum Chordata (chordates). Each organism is identified to the lowest taxonomic level possible with confidence. Page headers indicate the phylum, class, and order, and individual inventory records indicate family, genus, and species. If an organism could not be identified to species, the lowest taxonomic level is provided followed by "sp.". If more than one taxon was observed and differentiated a number follows (e.g. "sp. 1"). If more than one taxon was observed but

could not be differentiated, the lowest taxonomic level is followed by "spp.". Common names (if well established) or a brief description of the organism is included.

Confidence in Identification

Confidence in identification categories refer to previous records of the organism occurring on Cobb Seamount:

- Previously observed: This organism has been observed by divers or in imagery collected from submersibles at Cobb Seamount. Our confidence is high but there are no voucher specimens from this location to confirm.
- Previously collected: This organism has been collected at Cobb Seamount and identified by taxonomic experts.
- New record: This is the first record of this organism occurring on Cobb Seamount. There are no previous observations and no voucher specimens from this location. It is likely that this organism has been observed and/or collected in neighboring regions including other seamounts or from the continental shelf at similar depths.

If the organism was previously observed or collected at Cobb Seamount a numerical reference of the record's source follows the confidence category. Where,

[1] = Birkeland (1971)
[2] = Parker & Tunnicliffe (1994)
[3] = Douglas (2011)
[4] = Pearson et al. (1993)
[5] = Dower & Perry (2001)
[6] = an unpublished list compiled by Verena Tunnicliffe, University of Victoria (from submersible dive observations, photographs, & submersible & dredging collections in the 1980s-90s)
[7] = Royal British Columbia Museum invertebrate archives (pers. comm. Heidi Gartner)

Transects and depth

The transect(s) and the depth range (in meters) where the organism was observed during the 2012 cruise are provided. If the observed depth range exceeds the species' published known range a footnote indicating the discrepancy with relevant references is included. If the organism was not observed in the subset of imagery quantitatively annotated only a single observation depth may be known (no range data available).

Image(s)

For each taxon record a photograph or video still from the 2012 cruise is provided (with the image credit). Multiple photos are provided when an organism has different morphotypes or distinctly different juvenile and adult life-stages, or to demonstrate the appearance of the organism in a group/colony and the appearance of the organism close up. In images where the organism may be difficult to see, a white arrow or a red circle is used to indicate its location.

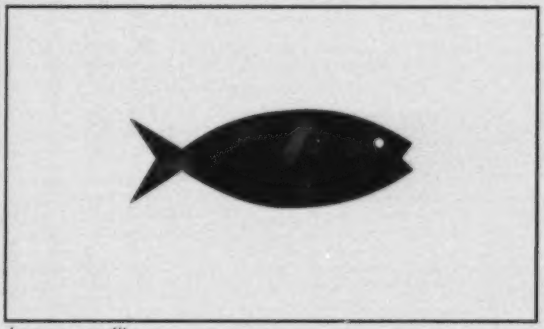
Table 1. The Cobb Seamount 2012 cruise remotely operated vehicles (ROVs) and NOAA autonomous underwater vehicle (AUV) dive summaries. Imagery viewed for this report was collected during 19 dives, including 18 completed transects and one incomplete transect at SFU_2*.

Vehicle	Number of transects	Transect names	Min. depth (m)	Max. depth (m)	Av. transect length (m)	Av. dive duration (hh:mm)
DFO ROV	12	DFO: 1-6, 8, 9, & 14-17	35	224	570	01:25
SFU ROV	2	SFU: 3 & 5	244	259	569	00:49
NOAA AUV	4	AUV: 1, 2, 4, & 5	433	1154	1800	03:43

*The SFU_2 transect was not completed due to technical issues, but species occurrences at that site, which was at approximately 373 m, were included in the report because these were the only data available from depths ranging from 259 m to 433 m.

Table 2. An example of the inventory record format and brief explanation of notation.

#. Phylum
#.#. Class
#.#.#. Order

 Image credit Photograph or video filename	Family name ***Scientific name*** **Common name** Taxonomic authority Confidence of identification Transect(s) where the organism was observed Depth range where the organism was observed (meters) Footnotes (if applicable)

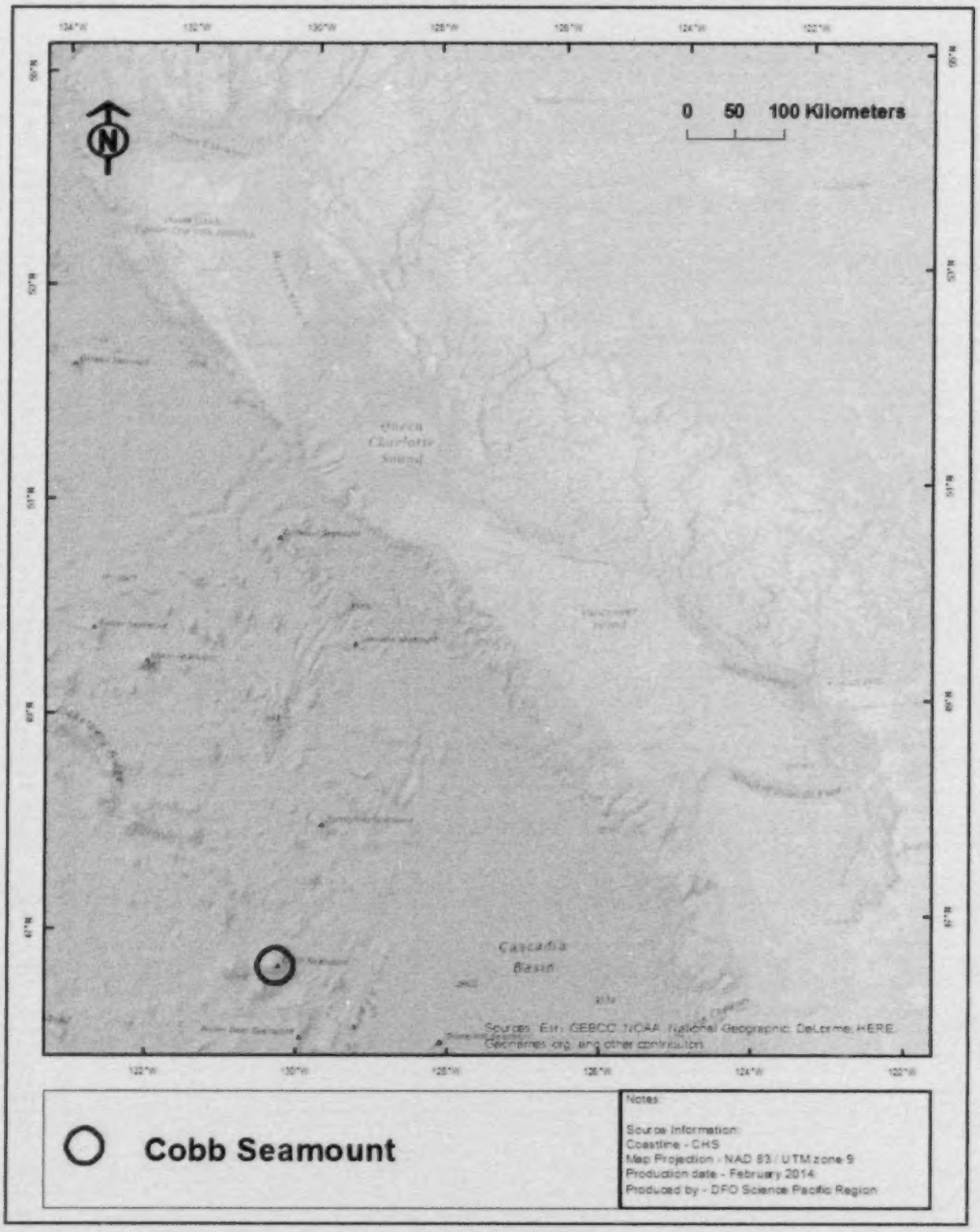


Figure 1. The location of Cobb Seamount, Northeast Pacific Ocean (approximately 500 km west-southwest of British Columbia, Canada; 46° 44.4' N, 130° 48' W).

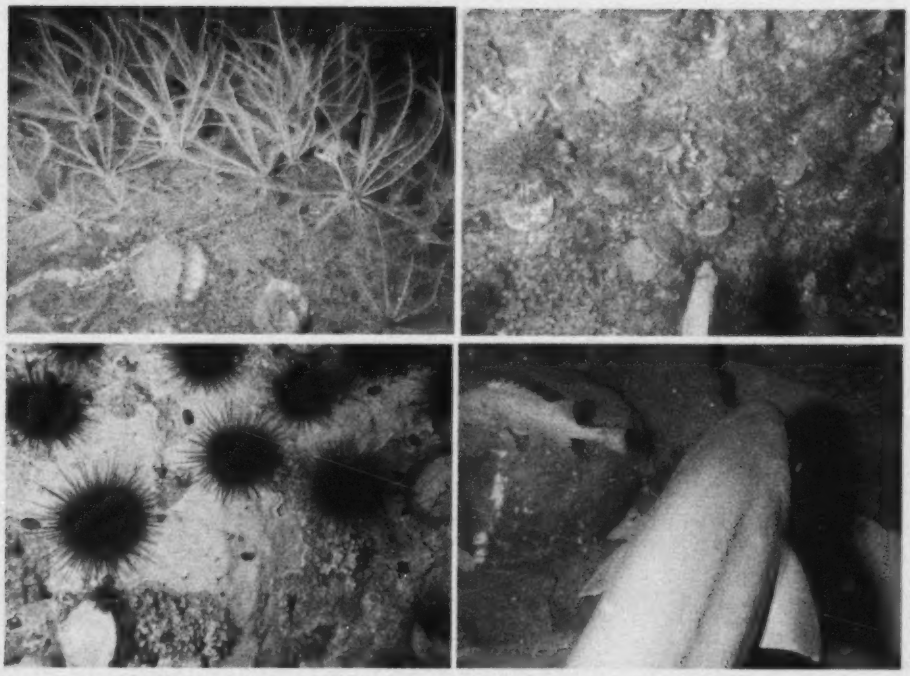


Figure 2. Examples of organisms observed during the Cobb Seamount 2012 cruise. Top left: Crinoids (*Florometra serratissima*) and swimming anemones (*Stomphia didemon*) on coralline algae (*Lithothamnion* spp. & *Lithophyllum* spp.) encrusted bedrock. Top right: A rosy rockfish (*Sebastes rosaceus*) and bedrock covered in giant rock scallops (*Crassadoma gigantea*), various encrusting sponges, strawberry anemones (*Corynactis californica*), tube worms (*Phyllochaetopterus prolifica*), and green encrusting bryozoan (cf *Reginella hippocrepis*). Lower left: Red urchins (*Mesocentrotus franciscanus*), topsnails (*Calliostoma annulatum* & *C. ligatum*), and chitons (*Leptochiton rugatus*) on coralline algae encrusted bedrock. Lower right: Bluntnose sixgill shark (*Hexanchus griseus*) and blackspotted rockfish (*Sebastes melanostictus*). Image credits: DFO PBS ROV team.

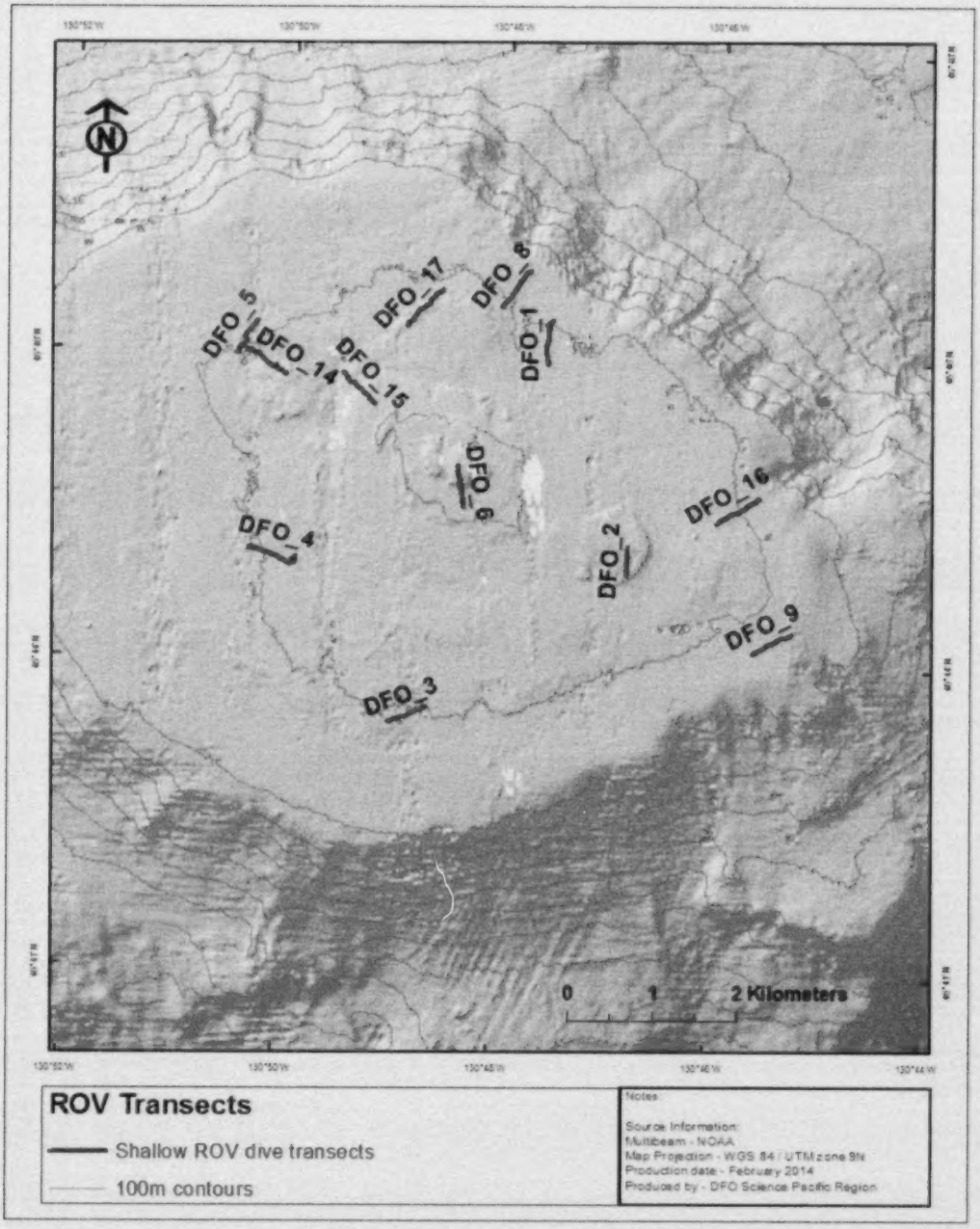


Figure 3. The Cobb Seamount 2012 DFO remotely operated vehicle (ROV) transects (n = 12).

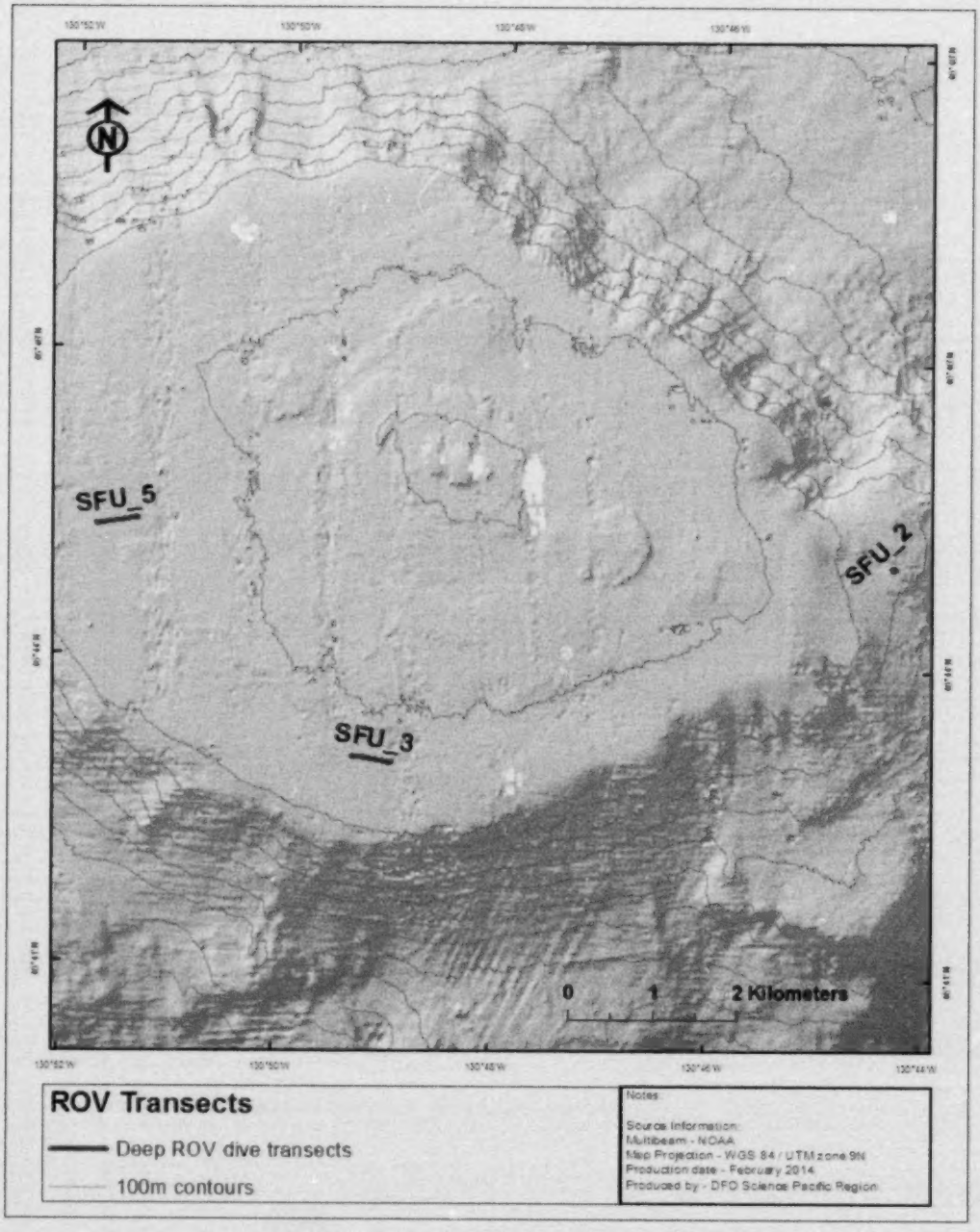


Figure 4. The Cobb Seamount 2012 SFU remotely operated vehicle (ROV) transects at SFU_3 and SFU_5 (n = 2) and the location of SFU_2 where a limited amount of imagery was collected.

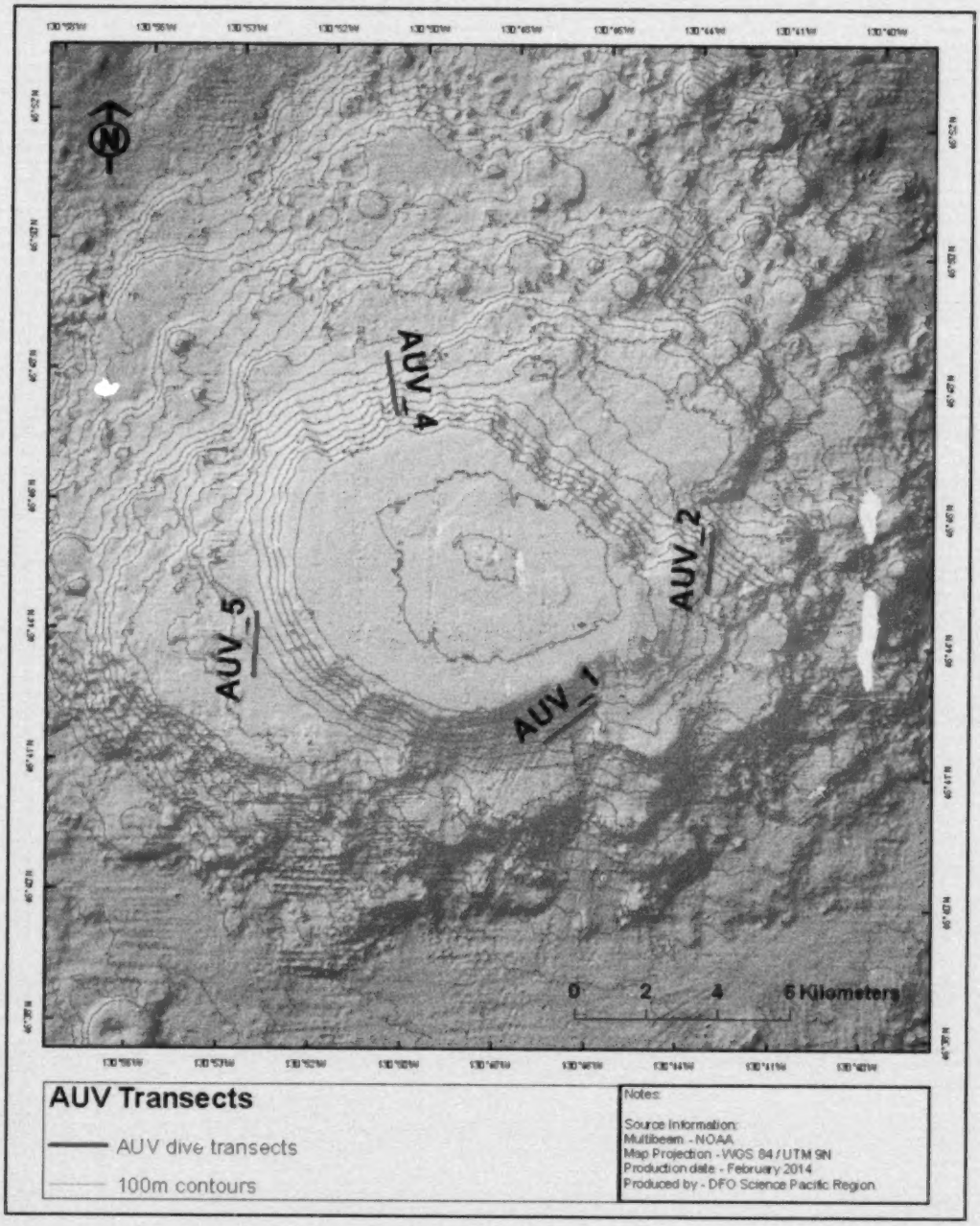


Figure 5. The Cobb Seamount 2012 NOAA autonomous underwater vehicle (AUV) transects (n = 4).

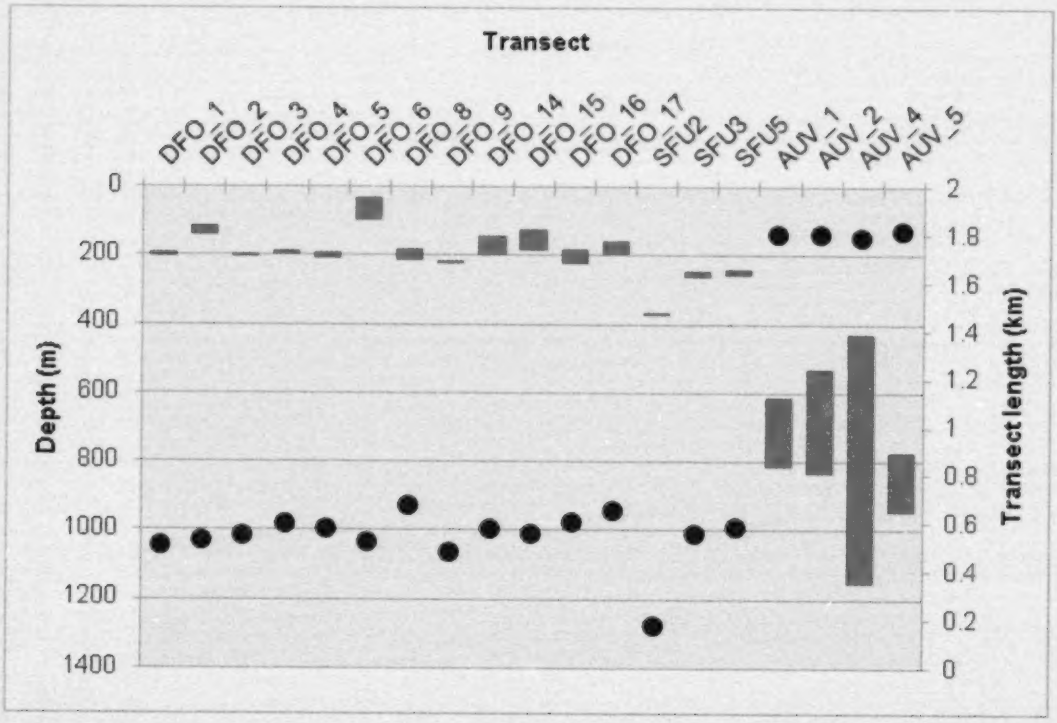
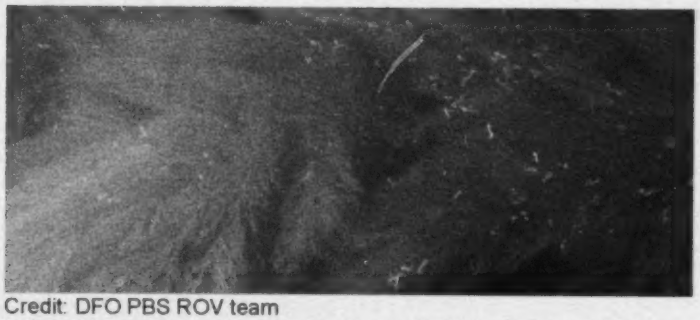


Figure 6. The depth range (in meters; blue bar) and transect length (in kilometers; black dots) surveyed during each DFO ROV, SFU ROV, and NOAA AUV transect on Cobb Seamount in 2012.18 transects surveyed a depth range of 35 to 1154 m and approximately 15 km of transects. DFO dives = DFO remotely operated vehicle (ROV); SFU dives = SFU remotely operated vehicle (ROV); AUV dives = NOAA autonomous underwater vehicle. The approximate track length and depth of video collected at site SFU_2 are also shown.

Species Inventory

1. Phylum: Ochrophyta – brown algae
1.1. Class: Phaeophyceae
1.1.1. Order: Desmarestiales



Credit: DFO PBS ROV team
Video still (top): Pac2012-043_HD_7_21_2012_10_43_37 PM009.mpg
Photo (lower): 072112_234109_ 211.jpg

Family Desmarestiaceae

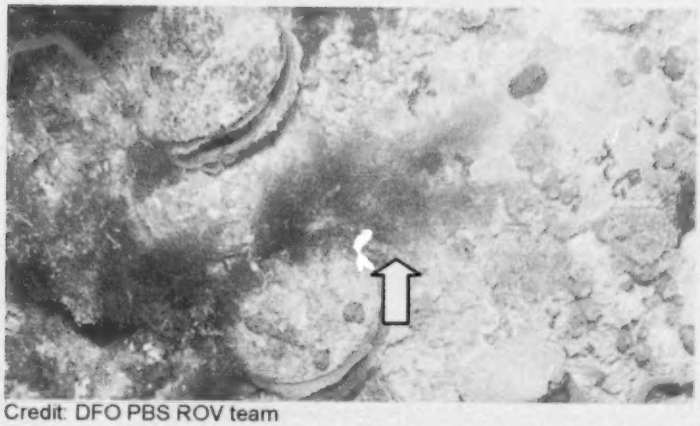
Desmarestia viridis
Stringy acid weed

Authority: Lamouroux 1813
Confidence: previously observed & collected [1, 2,6]

Transect: DFO_6
Depths (m): 34-49[1]

[1]This range extends deeper than the species' published maximum depth: shallow subtidal (Lamb & Hanby 2005).

2. Phylum: Rhodophyta – red algae
2.1. Class: Florideophyceae
2.1.1. Order: Ceramiales



Credit: DFO PBS ROV team
Photo: 072112_234632_ 226.jpg

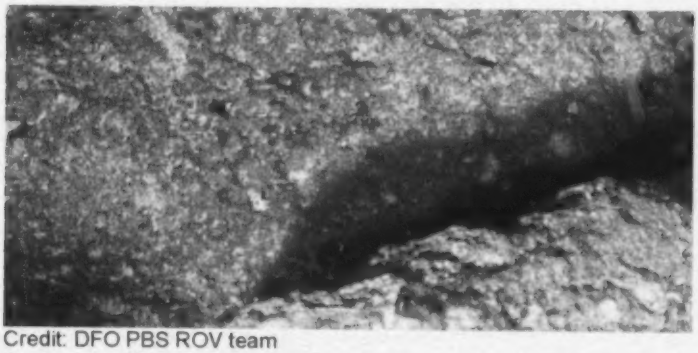
Family Rhodomelaceae

***Polysiphonia* spp.**
Filamentous red algae

Authority: Greville 1823
Confidence: previously observed [1,2,6]

Transect: DFO_6
Depth (m): 40

2. Phylum: Rhodophyta – red algae
2.1. Class: Florideophyceae
2.1.2. Order: Corallinales



Credit: DFO PBS ROV team
Photo (top): 072112_233009_ 189.jpg
Video still (lower): Pac2012-043_HD_7_26_2012_5_08_15 PM002.mpg

Family Corallinaceae & Hapalidiaceae

cf *Lithophyllum* spp. & cf *Lithothamnion* spp. Crustose coralline algae

Authority: Heydrich 1897 & Philippi 1837
Confidence: previously observed [1,2]

Transects: DFO_2, 6, 14,15, & 17
Depths (m): 34-191[1]

[1]This range extends deeper than the complex's published maximum depth: shallow subtidal (Lamb & Hanby 2005).

3. Phylum: Porifera – sponges

3.1. Class: Hexactinellida[3] – glass sponges

3.1.1. Order: Hexactinosida

Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120723.163027.00971.jpg
Photo (right): 20120724.165448.00757.jpg

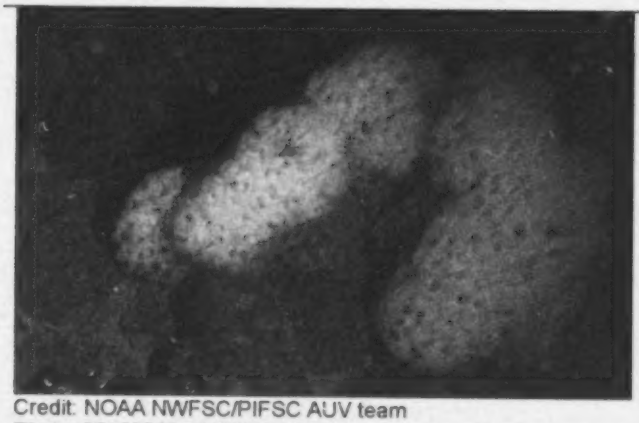
Family Euretidae

Pinulasma fistulosom[1]

Authority: Reiswig & Stone 2013
Confidence: new record

Transects: AUV_2, 4, & 5
Depths (m): 635-934

[1]Similar morphology to "*Lefroyella* sp.", a genus previously reported on Cobb Seamount [6].



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.164527.01151.jpg

Family Farreidae

***Farrea omniclavata* sp. nov.**[1]

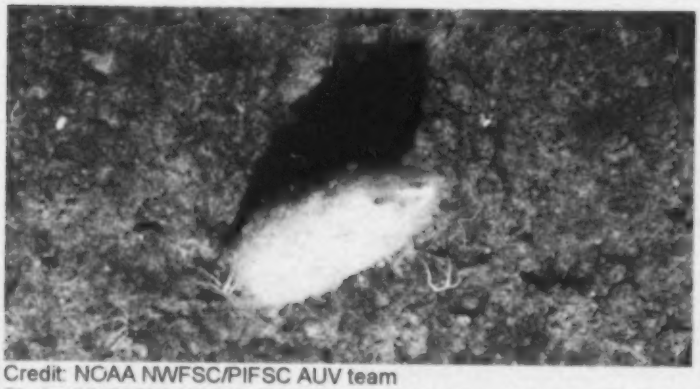
Authority: Reiswig 2013
Confidence: previously collected[1]

Transects: AUV_2, 4, & 5
Depths (m): 681-1147

[1]The paratype of this species was collected at Cobb Seamount (Reiswig 2013).

[3]Assistance with Hexactinellida taxa identification provided by H. Reiswig (pers. comm. February 28, 2014).

3. Phylum: Porifera – sponges
3.1. Class: Hexactinellida[4] – glass sponges
3.1.2. Order: Lyssacinosida



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.153956.00365.jpg

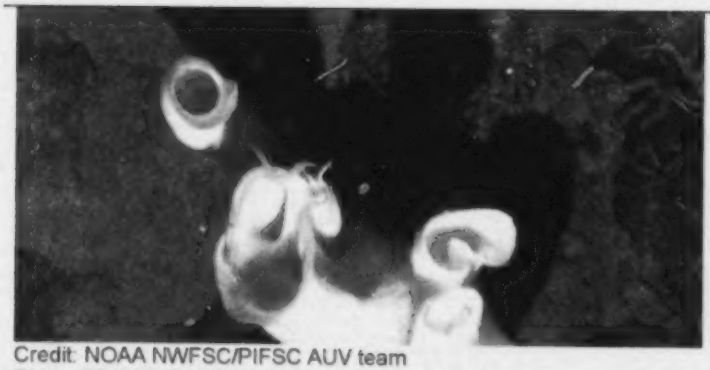
Family Rossellidae

***Acanthascus* spp., *Rhabdocalyptus* spp., & *Staurocalyptus* spp.[1]**
Boot sponges

Authority: Schulze 1886, Schulze 1886, and Ijima 1897
Confidence: previously observed[2] & collected[3] [6]

Transects: AUV_1, 2, 4, & 5
Depths (m): 501-1147

[1]Until recently all were included in *Acanthascus*
[2]*Acanthasus* sp.
[3]*Acanthascus* (*Staurocalyptus*) *fasciculatus*



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.155856.00593.jpg

Family Rossellidae

***Bathydorus* sp.**

Authority: Schulze 1886
Confidence: new record

Transects: AUV_2, 4, & 5
Depths (m): 567-887

[4]Assistance with Hexactinellida taxa identification provided by H. Reiswig (pers. comm. February 28, 2014).

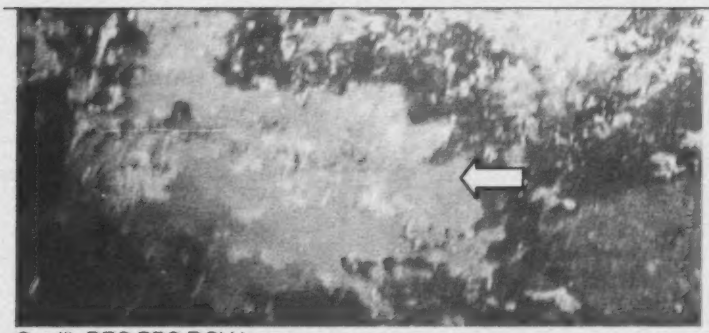
3. Phylum: Porifera – sponges
3.2. Class: Demospongiae

Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_26_2012_5_08_15 PM003.mpg

Demospongiae sp. 1
Slime sponge

Confidence: new record

Transcects: DFO_2, 3, 8, & 15; AUV_4
Depths (m): 127-436

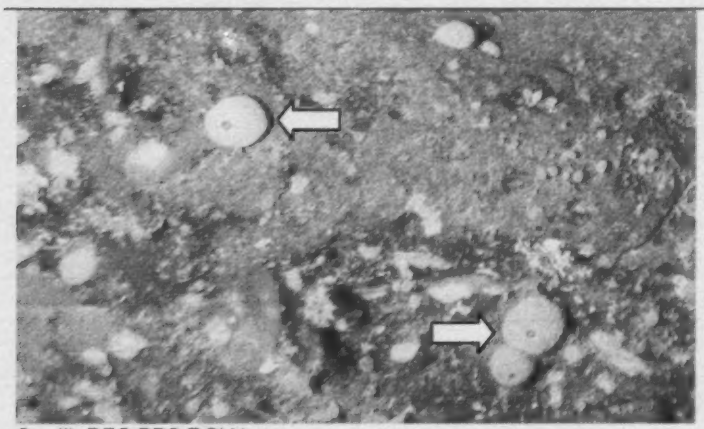


Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_23_2012_8_07_06 PM002.mpg

Demospongiae sp. 2
Encrusting grey-white sponge

Confidence: new record

Transcects: DFO_2, 3, 5, 14, & 15; AUV_1, 2, 4, & 5
Depths (m): 124-1131



Credit: DFO PBS ROV team
Photo: 072612_174203_ 131.jpg

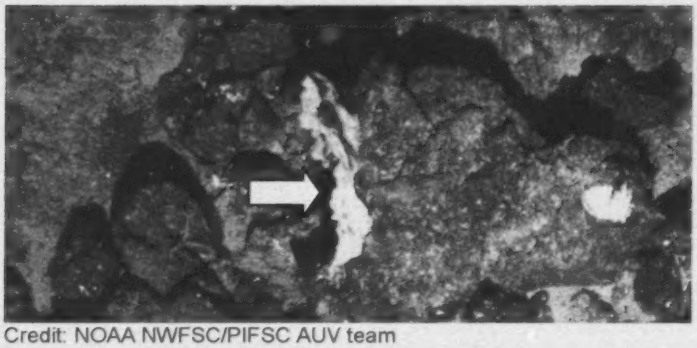
Demospongiae sp. 3[1]
Small white sponge

Confidence: new record

Transect: DFO_2; AUV_1, 2, & 4
Depths (m): 123-998

[1]Likely the "new species" of *Stylinos* (Lamb & Hanby 2005)

3. Phylum: Porifera – sponges
3.2. Class: Demospongiae
3.2.1. Order: Astrophorida



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.163558.00531.jpg

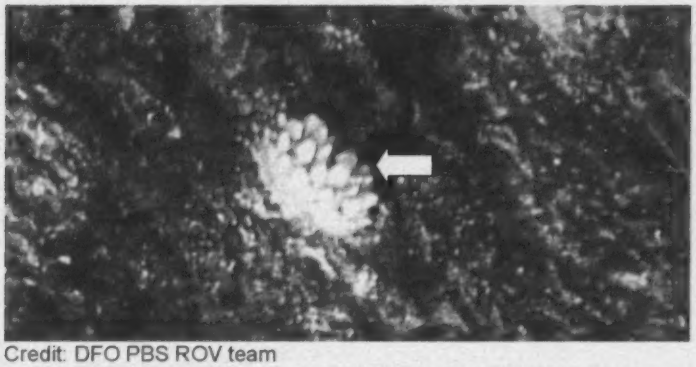
Family Vulcanellidae

***Poecillastra* sp.**
Plate sponge

Authority: Sollas 1888
Confidence: new record

Transect: AUV_4
Depths (m): 772

3. Phylum: Porifera – sponges
3.2. Class: Demospongiae
3.2.2. Order: Hadromerida



Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_21_2012_8_41_07 PM006.mpg

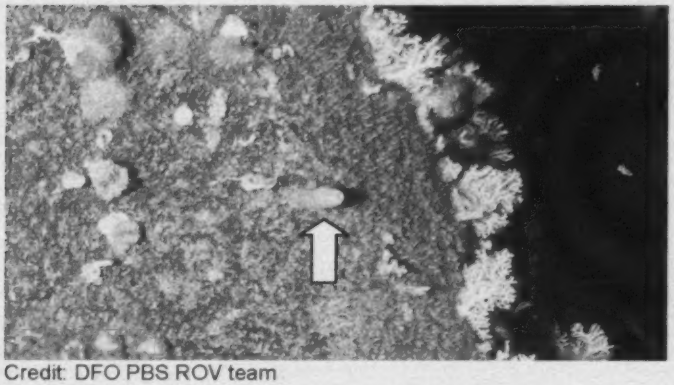
Family Polymastiidae

***Polymastia* sp.**
Nipple sponge

Authority: Bowerbank 1864
Confidence: new record

Transects: DFO_2 & 6
Depths (m): 94-141

3. Phylum: Porifera – sponges
3.2. Class: Demospongiae
3.2.3. Order: Halichondria



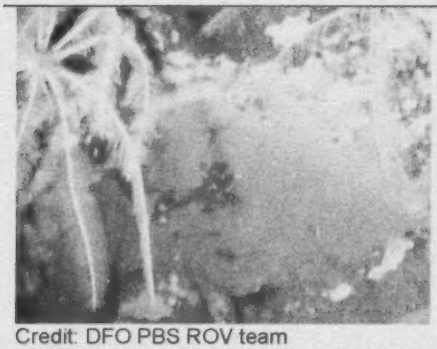
Credit: DFO PBS ROV team
Photo: 072212_175625_ 30.jpg

Family Axinellidae

cf *Auletta* sp.

Authority: Schmidt 1870
Confidence: new record

Transects: DFO_3, 4, 5, & 14
Depths (m):183-210



Credit: DFO PBS ROV team
Video still (left): Pac2012-043_HD_7_26_2012_5_08_15 PM007.mpg
Video still (right): Pac2012-043_HD_7_21_2012_8_41_07 PM006.mpg

Family Halichondriidae

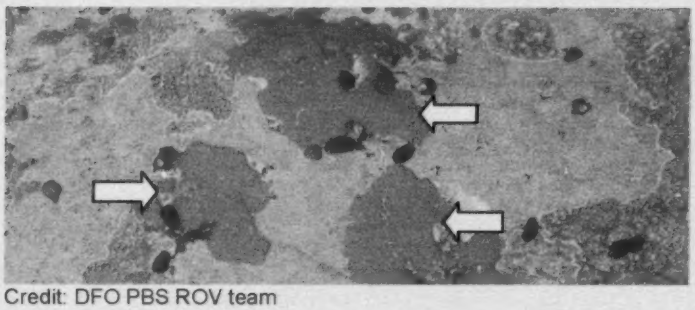
Halichondria panicea
Yellow-green breadcrumb sponge

Authority: Pallas 1766
Confidence: previously collected [2]

Transects: DFO_2, 3, 5, 6, 8, 14, 15, 16, & 17
Depths (m): 63-212[1]

[1]This range extends deeper than the species' published maximum depth: 100 m (Lamb & Hanby 2005).

3. Phylum: Porifera – sponges
3.2. Class: Demospongiae
3.2.4. Order: Poecilosclerida



Credit: DFO PBS ROV team
Photo: 072112_234517_ 221.jpg

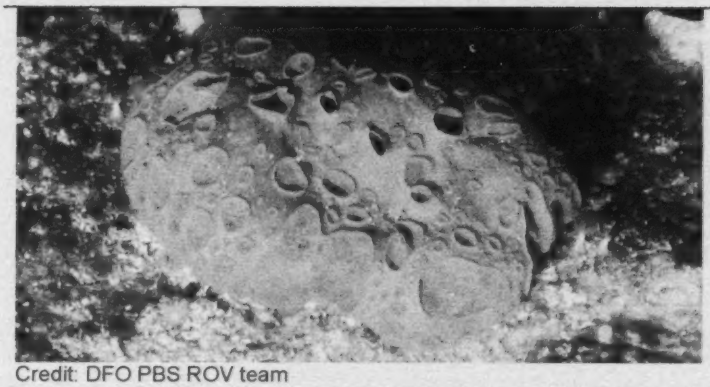
Family Acarnidae

cf *Acarnus erithacus*
Red encrusting sponge

Authority: de Laubenfels 1927
Confidence: new record[1]

Transcects: DFO_6 & 15
Depths (m): 35-127

[1]Similar organism previously described on Cobb Seamount but not identified (Birkeland 1971).



Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_26_2012_5_08_15 PM010.mpg

Family Latrunculiidae

Latrunculia* (*Biannulata*) *oparinae
Moon sponge

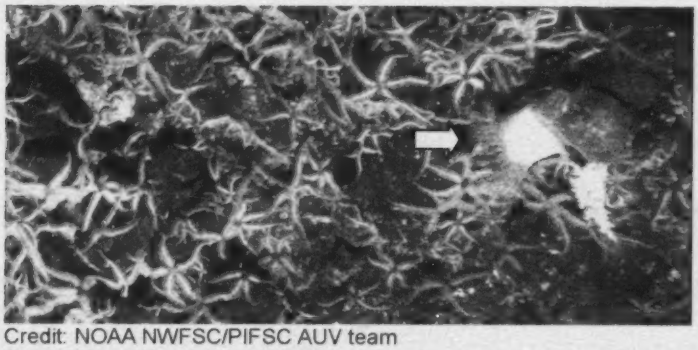
Authority: Samaai & Krasokhim 2002
Confidence: new record

Transect: DFO_15
Depths (m): 122-126

4. Phylum: Cnidaria – anemones, corals, hydroids, & others

4.1. Class: Anthozoa

4.1.1. Order: Actiniaria – sea anemones

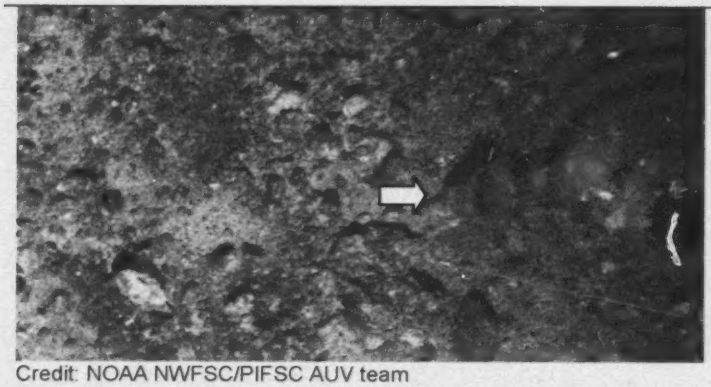


Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.161607.00293.jpg

Actiniaria sp. 1
Unknown red anemone

Confidence: new record

Transect: AUV_4
Depths (m): 615



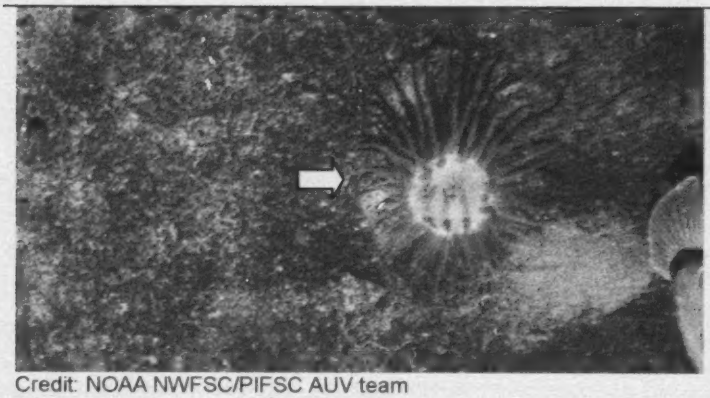
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.213754.00107.jpg

Actiniaria sp. 2[1]
Unknown deep-sea anemone

Confidence: new record

Transect: AUV_2
Depths (m): 785

[1]Likely *Bathyphellia* sp.

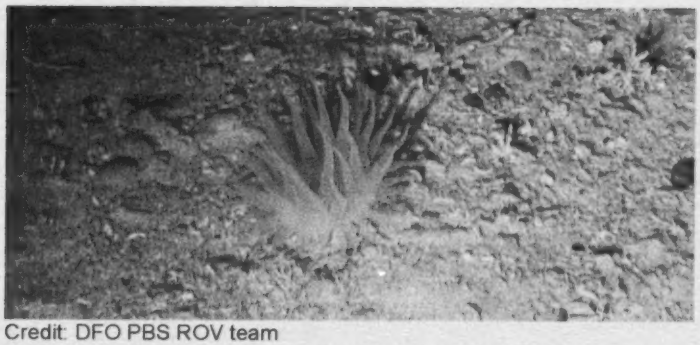


Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.031146.00864.jpg

Actiniaria sp. 3
Unknown deep-sea anemone

Confidence: new record

Transects: AUV_1 & 5
Depths (m): 619-939



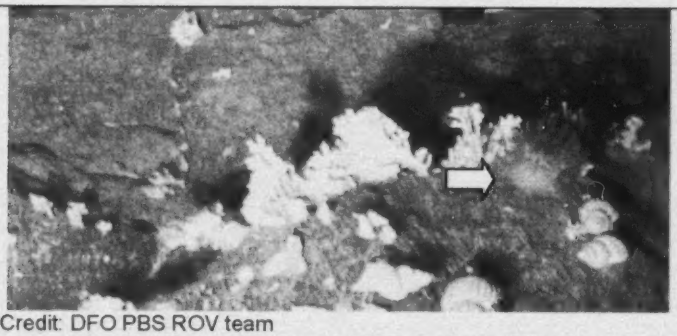
Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_26_2012_9_40_55 PM003.mpg

Family Actiniidae

Cribrinopsis fernaldi
Crimson anemone

Authority: Siebert & Spaulding 1976
Confidence: previously observed [1,2,6]

Transects: DFO_1 & 4; SFU_3 & 5
Depths (m): 196-259



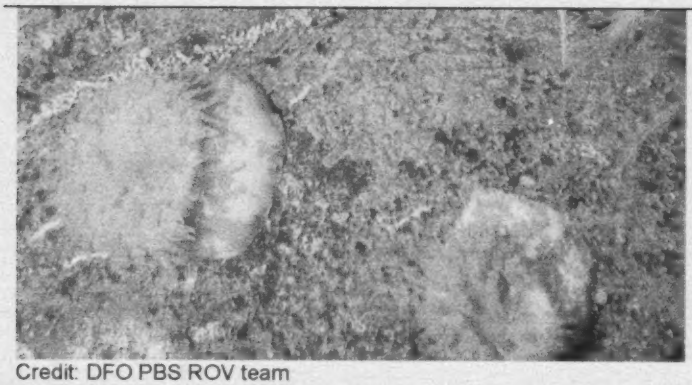
Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_23_2012_2_20_58 AM010.mpg

Family Actiniidae

Urticina crassicornis
Painted anemone

Authority: Muller 1776
Confidence: previously observed [2,6]

Transects: DFO_3; SFU_3 & 5
Depths (m): 193-259



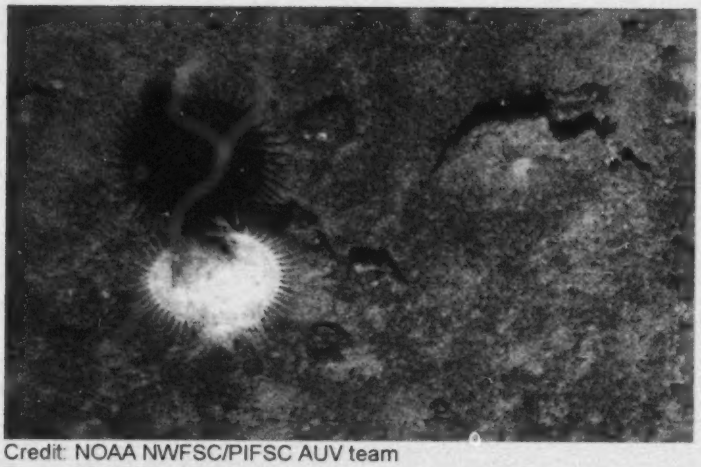
Credit: DFO PBS ROV team
Photo: 072112_211832_ 72.jpg

Family Actinostolidae

Stomphia didemon
Swimming/cowardly anemone

Authority: Siebert 1973
Confidence: previously observed [2,6]

Transects: DFO_2, 4, & 15
Depths (m): 121-187



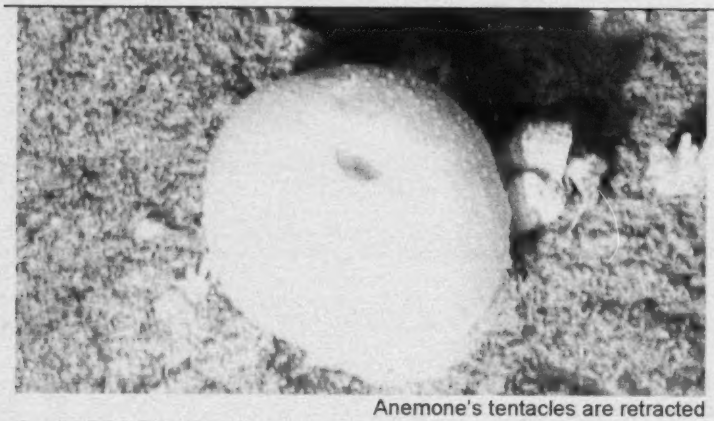
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.173008.01181.jpg

Family Hormathiidae

cf Hormathiidae sp.
Fly trap anemone

Authority: Carlgren 1932
Confidence: new record

Transcects: AUV_2 & 4
Depths (m): 527-1090



Anemone's tentacles are retracted

Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_23_2012_8_07_06 PM004.mpg

Family Metridiidae

Metridium senile
Plumose anemone

Authority: Linnaeus 1761
Confidence: previously observed [1,2,6]

Transects: DFO_2, 3, & 17
Depths (m): 116-220

4. Phylum: Cnidaria – anemones, corals, hydroids, & others
4.1. Class: Anthozoa
4.1.2. Order: Alcyonacea – soft corals

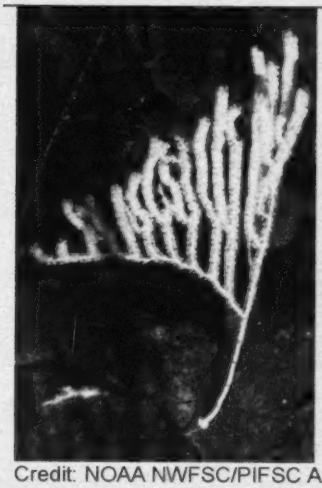
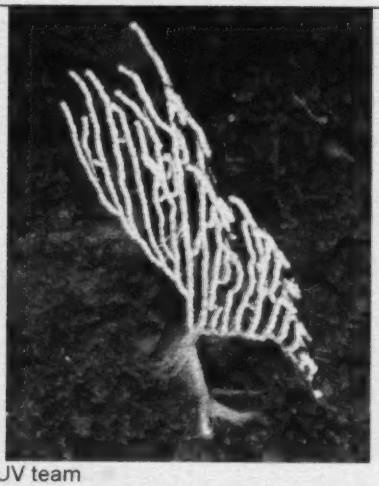
Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120722.040147.01465.jpg
Photo (right): 20120722.031146.00865.jpg

Family Alcyoniidae

Heteropolypus ritteri
Mushroom coral

Authority: Nutting 1909
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 436-1036

Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120724.162548.00409.jpg
Photo (right): 20120724.161838.00323.jpg

Family Isididae

***Isidella* sp.**

Authority: Gray 1857
Confidence: previously observed[1] [6]

Transects: AUV_2, 4, & 5
Depths (m): 495-875

[1]Documented by *Pisces* divers as *Acanella* sp.

Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.155847.00085.jpg

Family Isididae

***Keratoisis* sp.**

Authority: Wright 1869
Confidence: new record

Transcects: AUV_2 & 4
Depths (m): 436-819

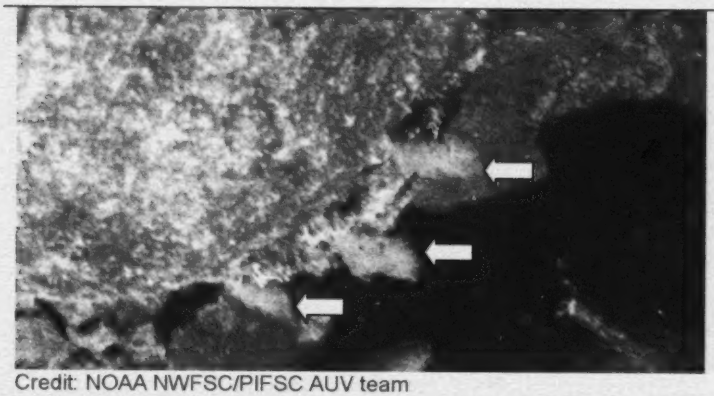
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.172748.01153.jpg

Family Isididae

***Lepidisis* sp.**

Authority: Verrill 1883
Confidence: new record

Transcects: AUV_2 & 4
Depths (m): 488-1154



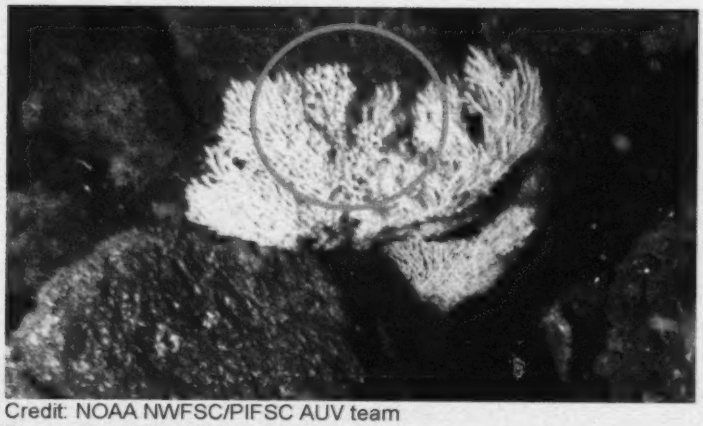
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.164427.01139.jpg

Family Nephtheidae

***Gersemia* sp.**

Authority: Marenzeller 1877
Confidence: new record

Transcects: AUV_2 & 4
Depths (m): 800-885



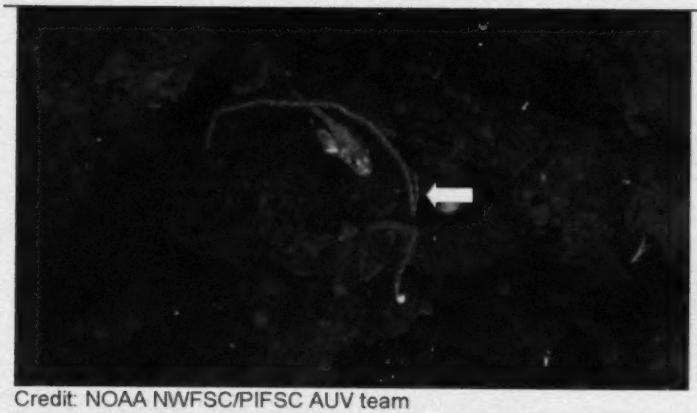
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.164748.00673.jpg

Family Paragorgiidae

***Paragorgia* sp.**
Bubble gum coral

Authority: Milne-Edwards 1857
Confidence: previously observed [6]

Transect: AUV_4
Depths (m): 825



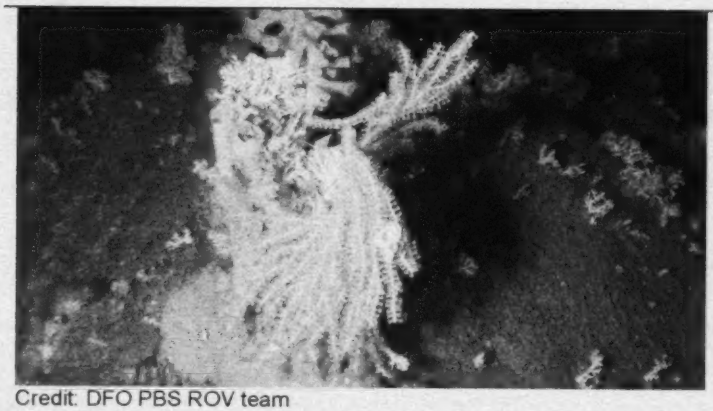
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.165828.00801.jpg

Family Plexauridae

Swiftia simplex

Authority: Nutting 1909
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 536-1083



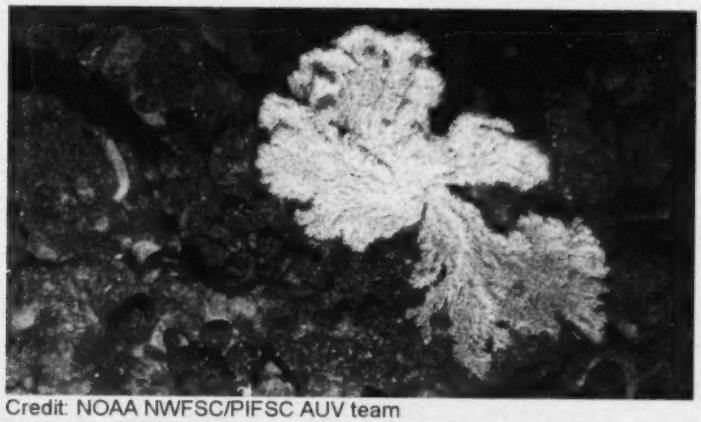
Credit: DFO PBS ROV team
Photo: 072212_175655_ 32.jpg

Family Primnoidae

***Narella* sp.**

Authority: Gray 1870
Confidence: new record

Transect: DFO_4
Depths (m): 198



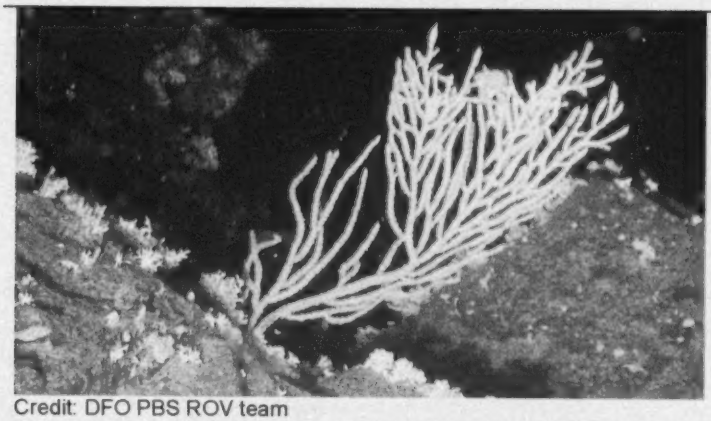
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.163938.00575.jpg

Family Primnoidae

Plumarella superba

Authority: Nutting 1912
Confidence: new record

Transcect: AUV_4
Depths (m): 788-826



Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_23_2012_2_20_58 AM009.mpg

Family Primnoidae

Primnoa* cf *pacifica
Red tree coral

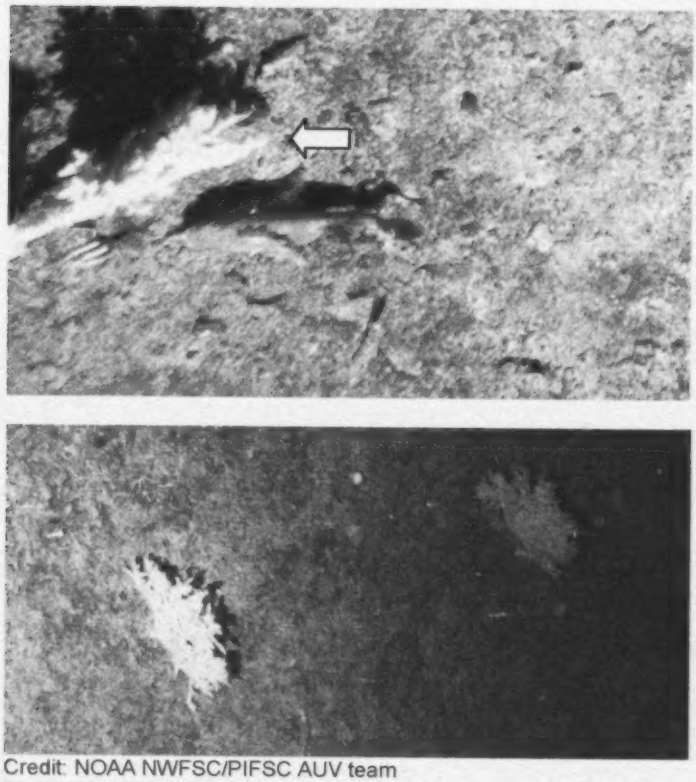
Authority: Kinoshita 1907
Confidence: previously observed [6]

Transects: DFO_3; SFU_2; AUV_2 & 4
Depths (m): 198-888

4. Phylum: Cnidaria – anemones, corals, hydroids, & others

4.1. Class: Anthozoa

4.1.3. Order: Antipatharia – black corals

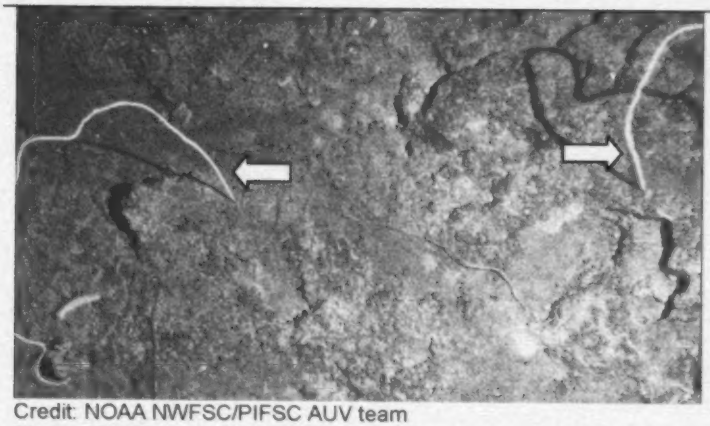


Antipatharia sp.
Unknown black coral

Confidence: new record

Transects: AUV_2, 4, & 5
Depths (m): 524-1086

Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.155116.00501.jpg (above)
Photo: 20120723.154050.00188.jpg (below)



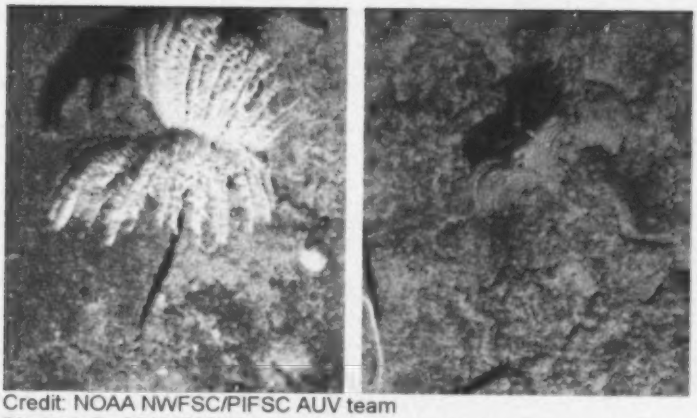
Family Antipathidae

***Stichopathes* sp.**

Authority: Brook 1889
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 681-840

Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.161506.00787.jpg



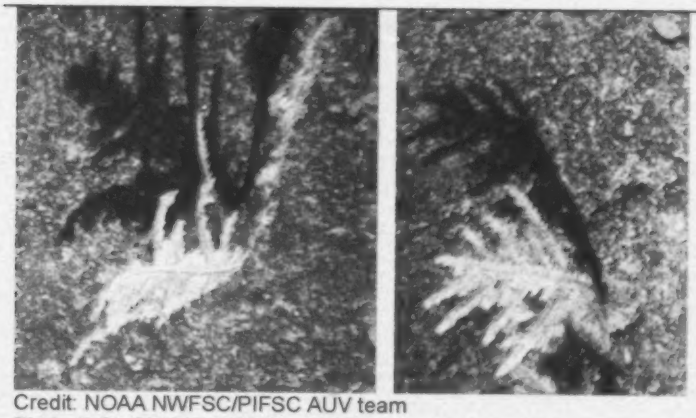
Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120722.030606.00797.jpg
Photo (right): 20120724.164308.00617.jpg

Family Schizopathida

***Bathypathes* sp.**

Authority: Brook 1889
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 681-1153



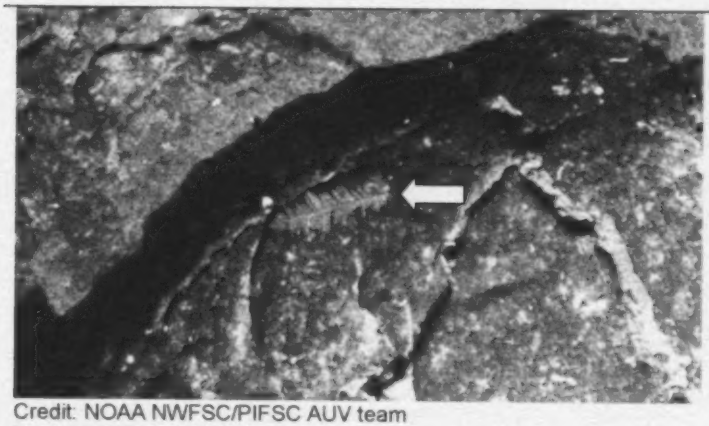
Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120722.032156.00987.jpg
Photo (right): 20120724.164308.00617.jpg

Family Schizopathida

Lillipathes* cf *lillei

Authority: Totton 1923
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 436-1088



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.035407.01373.jpg

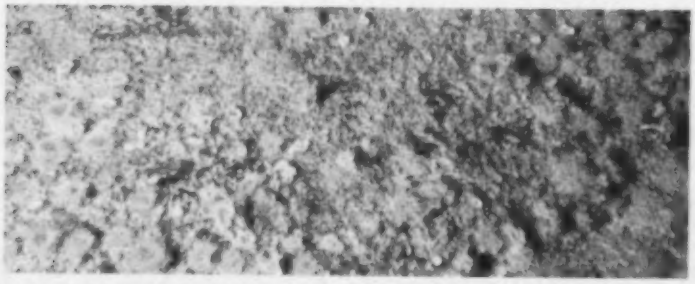
Family Schizopathida

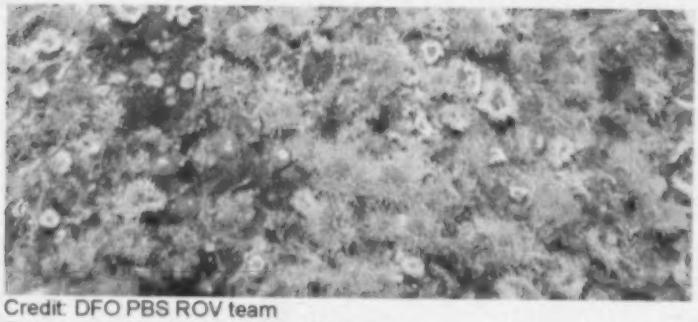
***Parantipathes* sp.**

Authority: Brook 1889
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 775-1003

4. Phylum: Cnidaria – anemones, corals, hydroids, & others
4.1. Class: Anthozoa
4.1.4. Order: Corallimorpharia





Credit: DFO PBS ROV team
Photo (top): 072112_231108_ 151.jpg
Photo (lower): 072112_231539_ 160.jpg

Family Corallimorphidae

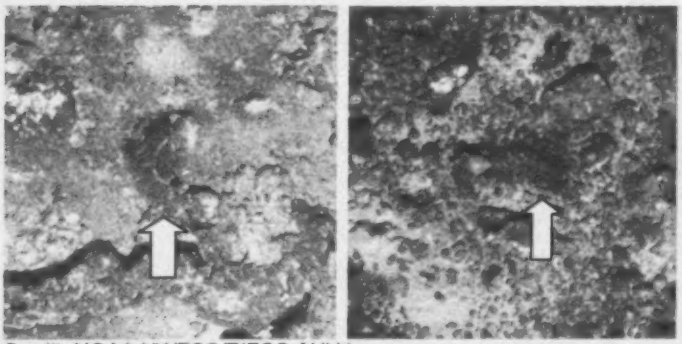
Corynactis californica
Strawberry anemone

Authority: Carlgren 1936
Confidence: previously observed & collected [1,2,6]

Transect: DFO_6
Depths (m): 34-95[1]

[1]This range extends deeper than the species' published maximum depth (45 m; Lamb & Hanby 2005) but is similar to previously observed depths on Cobb Seamount (90 m; [6]).

4. Phylum: Cnidaria – anemones, corals, hydroids, & others
4.1. Class: Anthozoa
4.1.5. Order: Pennatulacea – sea pens



Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120722.035947.01441.jpg
Photo (right): 20120722.215125.00269.jpg

Family Anthoptilidae

***Anthoptilum* spp.**[1]
Feather boa sea pen

Authority: Kölliker 1880
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 723-1003

[1]It is difficult to distinguish *A. grandiflorum* and *A. murrayi* owing to their similar morphologies, small size, and the limited resolution of the imagery; both species may occur in this region

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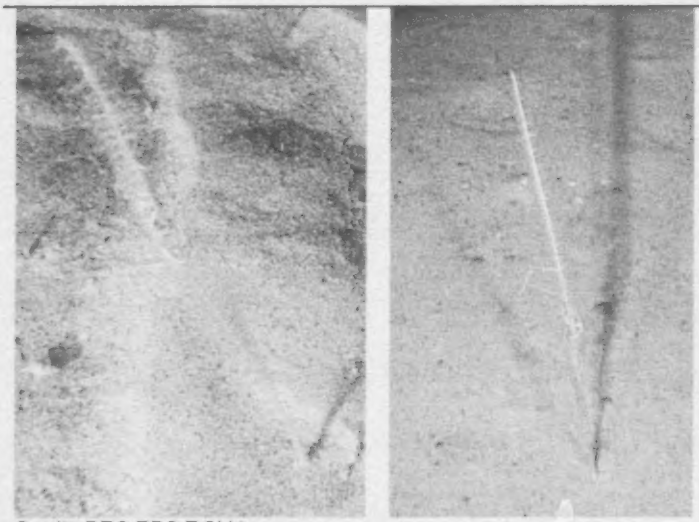


Credit: DFO PBS ROV team
Photo (left): 072612_200009_ 389.jpg
Video still (right): Pac2012-043_HD_7_22_2012_5_44_12 PM003.mpg

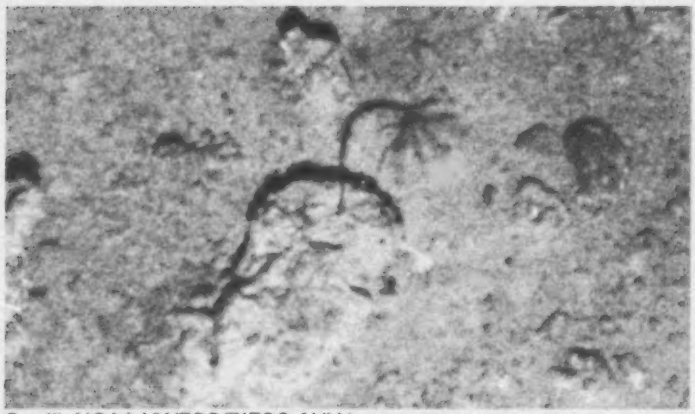
Family Halipteridae

Halipteris willemoesi[1]
Sea whip

Authority: Kölliker 1870
Confidence: new record

Transects: DFO_1, 3, 4, 5, 8, 9, 15, 16, & 17; SFU_5; AUV_1 & 2
Depths (m): 99-807

[1]Likely the same sea whip listed as *Stylatula elongate* by Parker & Tunnicliffe (1994)



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722_230155_01115.jpg

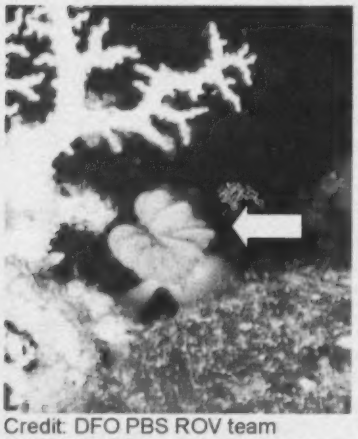
Family Umbellulida

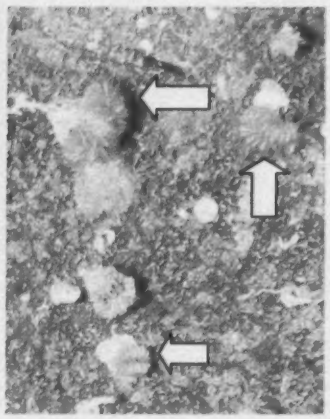
Umbellula lindahli

Authority: Kölliker 1875
Confidence: new record

Transect: AUV_5
Depth (m): 920

4. Phylum: Cnidaria – anemones, corals, hydroids, & others
4.1. Class: Anthozoa
4.1.6. Order: Scleractinia – stony corals





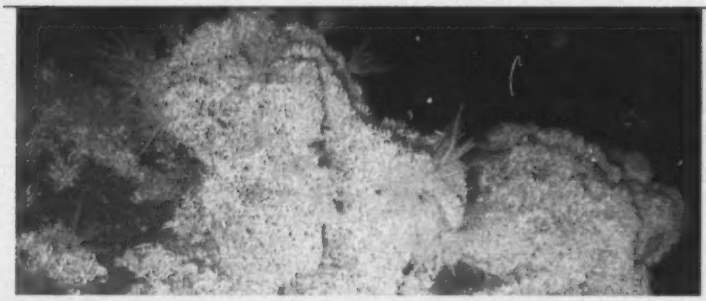
Credit: DFO PBS ROV team
Video still (left): Pac2012-043_HD_7_22_2012_6_34_51 PM.mpg
Photo (right): 072212_175625_ 30.jpg

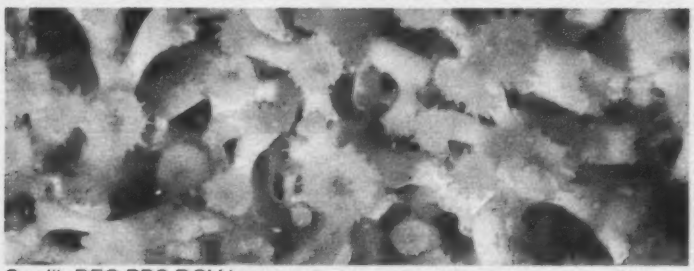
Family Caryophylliidae

Desmophyllum dianthus
Orange cup coral

Authority: Esper 1794
Confidence: previously collected [2,6]

Transects: DFO_3, 4, 5, 8, 14, 15, 16, & 17; SFU_2, & 3; AUV_4
Depths (m): 91-557





Credit: DFO PBS ROV team
Video still (top): Pac2012-043_HD_7_26_2012_7_27_22 PM009.mpg
Video still (lower): Pac2012-043_HD_7_26_2012_7_27_22 PM008.mpg

Family Caryophylliidae

Lophelia pertusa

Authority: Linnaeus 1758
Confidence: previously observed & collected [6][1]

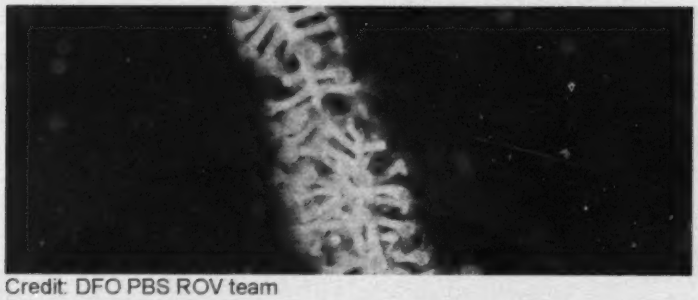
Transects: DFO_3, 16, & 17; SFU_3
Depths (m): 162-254

[1]Voucher specimens collected during the Cobb Seamount 2012 cruise.

4. Phylum: Cnidaria – anemones, corals, hydroids, & others

4.1. Class: Anthozoa

4.1.7. Order: Zoantharia



Credit: DFO PBS ROV team
Photo: 072212_175655_ 32.jpg

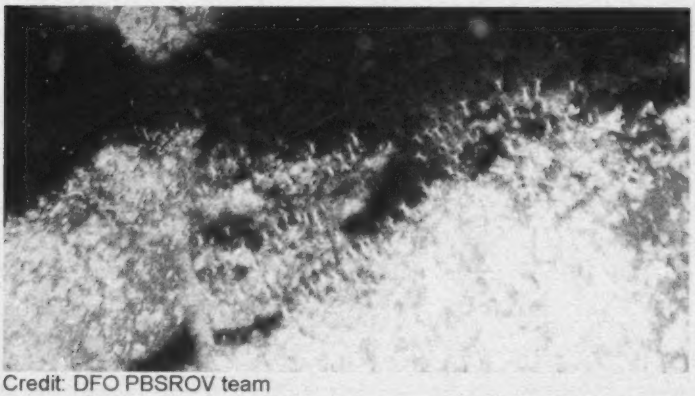
Family Epizoanthidae

***Epizoanthus* sp.**
Zoanthid

Authority: Gray 1867
Confidence: previously observed [2,6]

Transect: DFO_4
Depths (m): 198

4. Phylum: Cnidaria – anemones, corals, hydroids, & others
4.2. Class: Hydrozoa

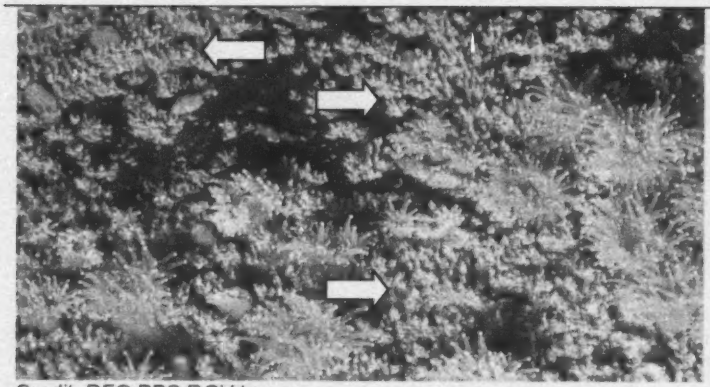


Credit: DFO PBSROV team
Photo: 072712_014001_ 881.jpg

Hydroid sp. 1
Unknown micro-polyp hydroid

Authority: Owen 1843
Confidence: new record

Transects: DFO_3, 5, 6, 8, 15, & 17
Depths (m): 58-209



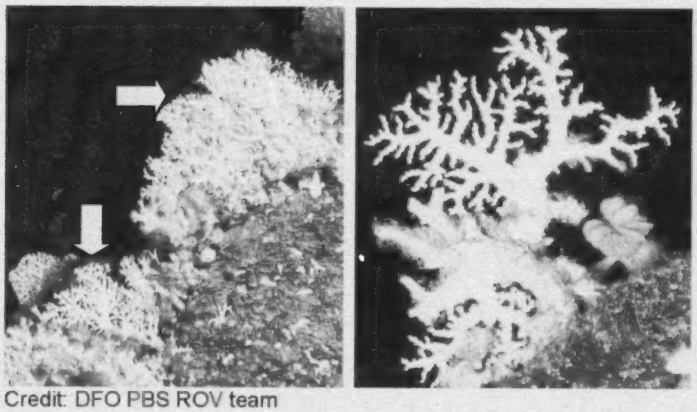
Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_21_2012_10_43_37 PM004.mpg

Hydroid sp. 2
Unknown encrusting hydroid

Authority: Owen 1843
Confidence: new record

Transect: DFO_6
Depth (m): 84

4. Phylum: Cnidaria – anemones, corals, hydroids, & others
4.2. Class: Hydrozoa
4.2.1. Order: Anthoathecata



Credit: DFO PBS ROV team
Video still (left): Pac2012-043_HD_7_27_2012_1_21_00 AM007.mpg
Video still (right): Pac2012-043_HD_7_22_2012_6_34_51 PM.mpg

Family Stylasteridae

***Stylaster* spp.**

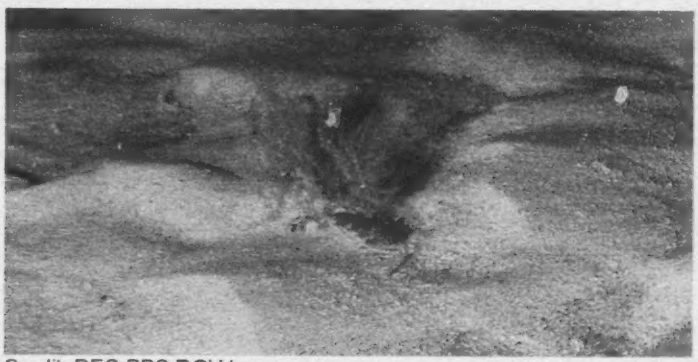
Authority: Gray 1847
Confidence: previously observed & collected[1] [2,6][2]

Transects: DFO_3, 4, 5, 8, 9, 14, 15, 16, & 17; SFU_3; AUV_1 & 4
Depths (m): 91-886

[1]*Stylaster verrillii* & *S. campylecus*

[2]Voucher specimens collected during the Cobb Seamount 2012 cruise.

4. Phylum: Cnidaria – anemones, corals, hydroids, & others
4.2. Class: Hydrozoa
4.2.1. Order: Leptothecata



Credit: DFO PBS ROV team
Photo: 072612_195224_ 358.jpg

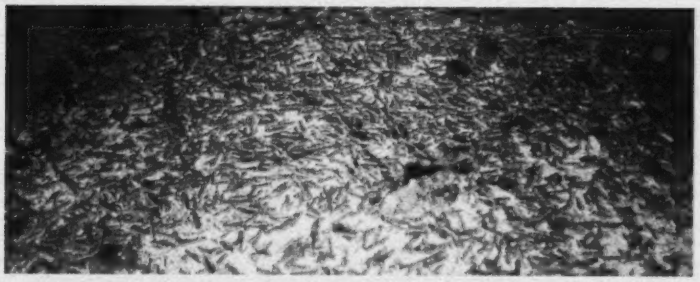
Family Campanulariidae

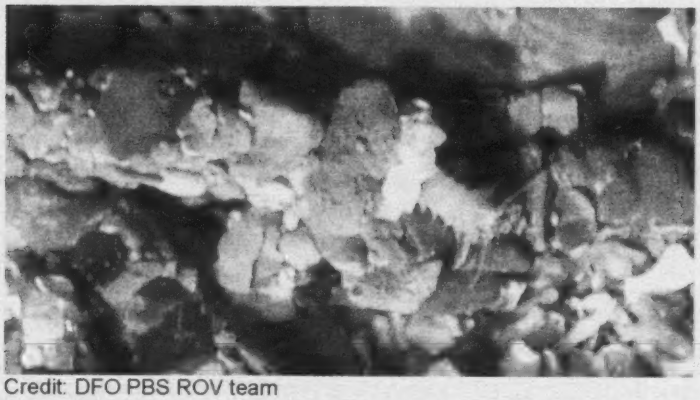
cf *Obelia* spp.
Wine-glass hydroid

Authority: Péron & Lesueur 1810
Confidence: new record

Transects: DFO_1, 6, 8, 9, 15, 16, & 17
Depths (m): 40-220

5. Phylum: Annelida – worms
5.1. Class: Polychaeta
5.1.1. Order: Eunicida





Credit: DFO PBS ROV team
Video still (both): Pac2012-043_HD_7_21_2012_10_43_37 PM.mpg

Family Onuphidae

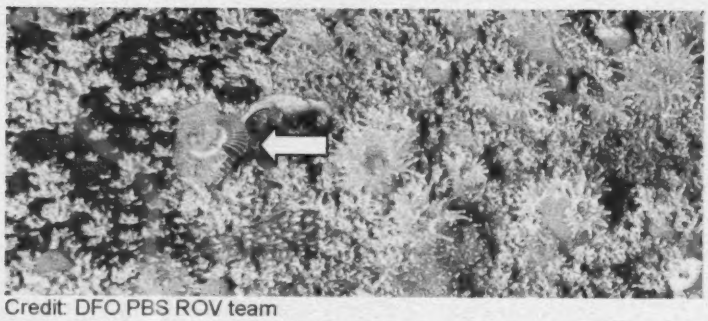
Nothria conchylega

Authority: Sars 1835
Confidence: previously collected [2,6][1]

Transcects: DFO_2, 6, 8, & 9
Depths (m): 89-191

[1]Voucher specimen collected during the Cobb Seamount 2012 cruise.

5. Phylum: Annelida – worms
5.1. Class: Polychaeta
5.1.2. Order: Sabellida



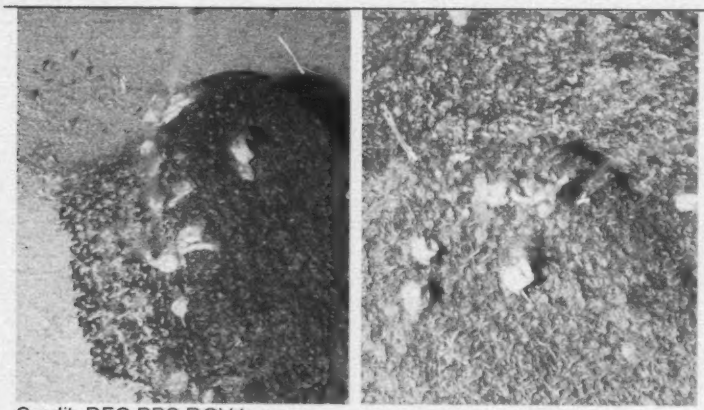
Credit: DFO PBS ROV team
Photo: 072112_231108_ 151.jpg

Family Serpulidae

Crucigera zygophora
Yoke-bearer calcareous tubeworm

Authority: Johnson 1901
Confidence: previously collected [2,6]

Transect: DFO_6
Depths (m): 83



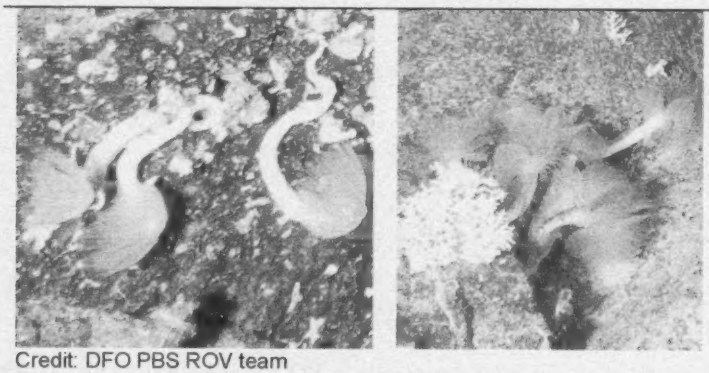
Credit: DFO PBS ROV team
Photo (left): 072212_175555_ 28.jpg
Photo (right): 072212_175625_ 30.jpg

Family Serpulidae

***Paradexiospira* sp.**
Dwarf calcareous tubeworm

Authority: Caullery & Mesnil 1897
Confidence: previously observed & collected [1,2]

Transects: DFO_3, 4, 5, 6, 8, 14, 15, & 17
Depths (m): 58-221



Credit: DFO PBS ROV team
Photo (left): 072712_020346_ 976.jpg
Photo (right): 072212_184040_ 207.jpg

Family Serpulidae

Protula pacifica
White-crown calcareous tubeworm

Authority: Pixell 1912
Confidence: previously collected [2,6]

Transects: DFO_2, 3, 4, 5, 6, 8, 14, 15, 16, & 17
Depths (m): 84-224

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5. Phylum: Annelida – worms
5.1. Class: Polychaeta
5.1.3. Order: Spionida

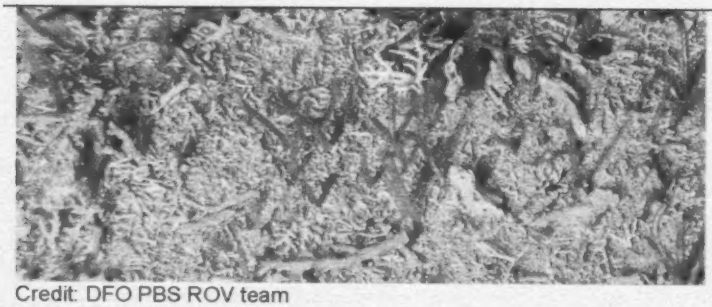
Credit: DFO PBS ROV team
Photo (left): 072112_231639_ 162.jpg
Photo (right): 072112_233009_ 189.jpg

Family Chaetopteridae

Phyllochaetopterus prolifica

Authority: Potts 1914
Confidence: previously observed & collected [1,2,6]

Transect: DFO_6
Depths (m): 34-69



Credit: DFO PBS ROV team
Photo: 072612_153531_ 148.jpg

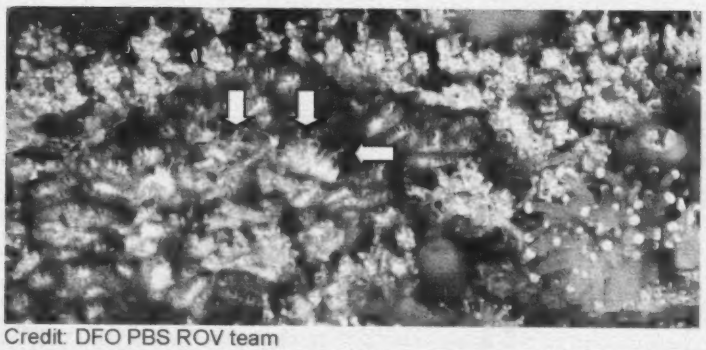
Family Chaetopteridae

Spiochaetopterus* cf *costarum

Authority: Claparède 1869
Confidence: new record

Transects: DFO_1, 2, 3, 4, 5, 6, 8, 9, 14, 15, 16, & 17
Depths (m): 84-223

6. Phylum: Arthropoda – crabs, hermits, & others
6.1. Class: Malacostraca
6.1.1. Order: Amphipoda



Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_21_2012_10_43_37 PM004.mpg

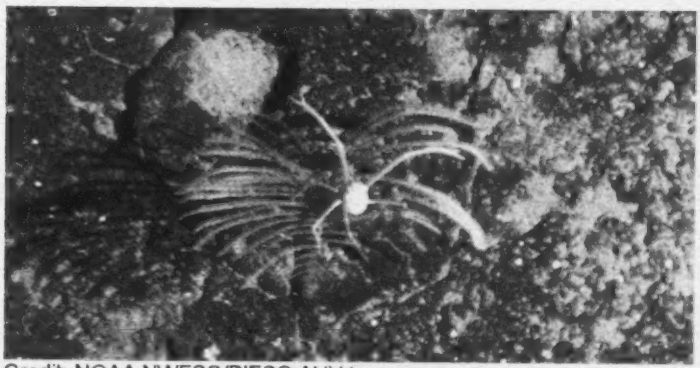
Family Caprellidae

***Caprella* sp.**

Authority: Leach 1814
Confidence: genus previously collected [2]

Transcect: DFO_6
Depth (m): 84

6. Phylum: Arthropoda – crabs, hermits, & others
6.1. Class: Malacostraca
6.1.2. Order: Decapoda – crabs



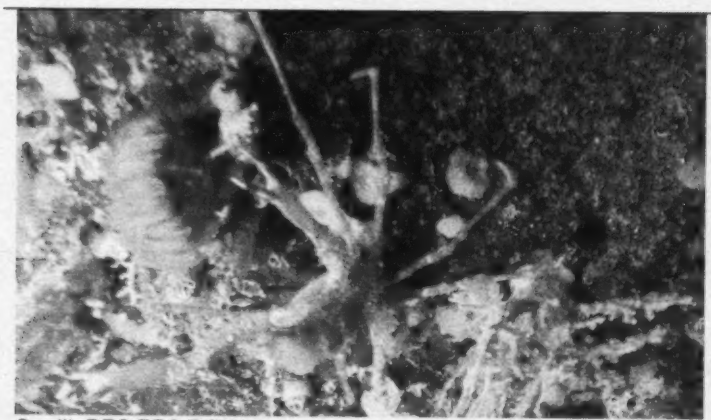
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.215255.00287.jpg

Family Chirostylidae

Chirostylidae sp.
Unknown squat lobster

Authority: Ortmann 1892
Confidence: new record

Transcects: AUV_1, 2, 4, & 5
Depths (m): 562-1145



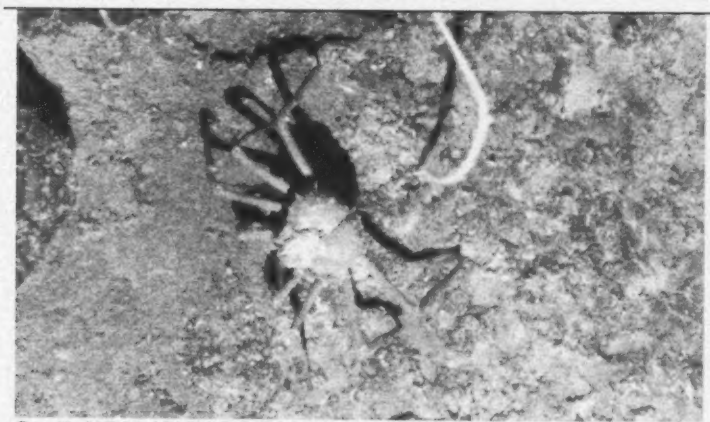
Credit: DFO PBS ROV team
Photo: 072212_184625_ 230.jpg

Family Epialtidae

Chorilia longipes
Redclaw crab

Authority: Dana 1851
Confidence: previously observed & collected [1,2,6]

Transcects: DFO_2, 3, 4, 5, 6, 9, 15, & 17; AUV_1, 4, & 5
Depths (m): 40-1140



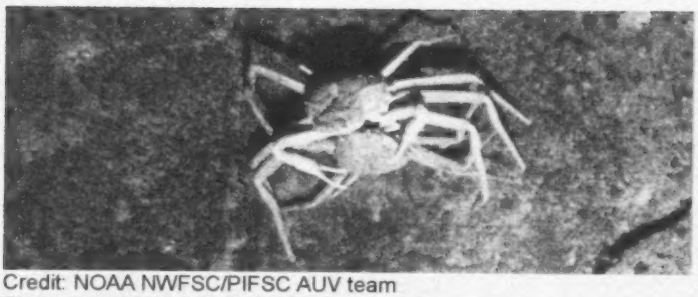
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.162046.00855.jpg

Family Lithodidae

Lithodes couesi
King Crab

Authority: Benedict 1895
Confidence: new record

Transcects: AUV_1, 2, & 4
Depths (m): 623-1141



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.025156.00627.jpg

Family Majidae

Chionoecetes tanneri
Grooved tanner crab

Authority: Rathbun 1893
Confidence: new record

Transcects: AUV_1, 2, 4, & 5
Depths (m): 619-1138

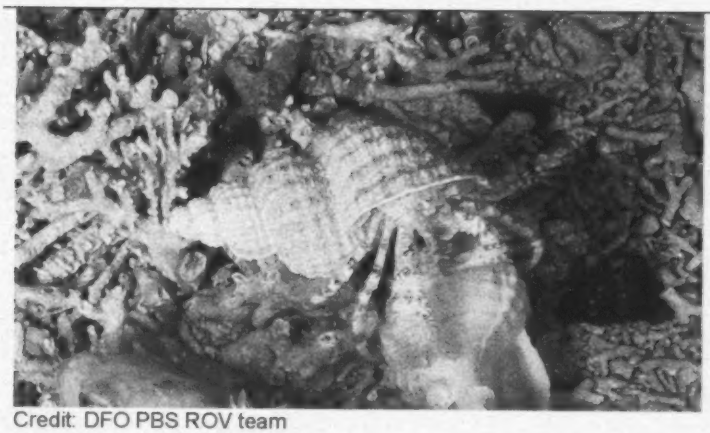
Credit: DFO PBS ROV team
Photo: 072312_023316_ 44.jpg

Family Paguridae

Elassochirus cavimanus
Purple hermit crab

Authority: Miers 1879
Confidence: previously observed [1]

Transcect: DFO_5
Depths (m): 194



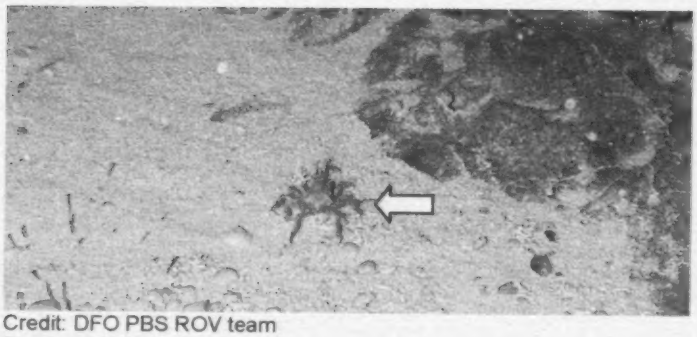
Credit: DFO PBS ROV team
Photo: 072612_152331_ 100.jpg

Family Paguridae

Pagurus kennerlyi
Hermit crab

Authority: Stimpson 1854
Confidence: previously collected [6]

Transcects: DFO_1, 2, 3, 4, 5, 6, 8, 9, 14, 15, 16, & 17; SFU_3, & 5
Depths (m): 46-259



Credit: DFO PBS ROV team
Photo: 072712_015716_ 950.jpg

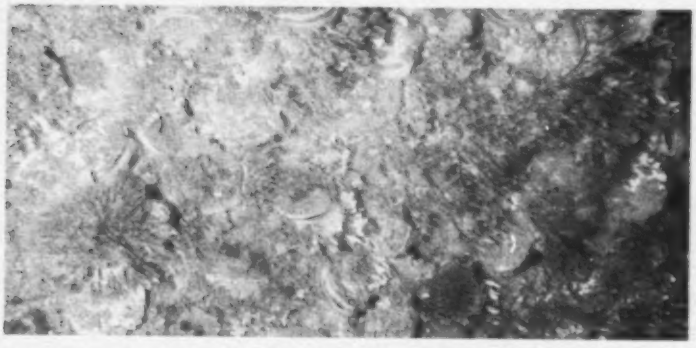
Family Oregoniidae

Oregonia gracilis
Graceful decorator crab

Authority: Dana 1851
Confidence: previously collected [2,6]

Transcect: DFO_17
Depth (m): 167

7. Phylum: Mollusca – bivalves, nudibranchs, octopus, & others
7.1. Class: Bivalvia
7.1.1. Order: Pectinoida



Family Pectinidae

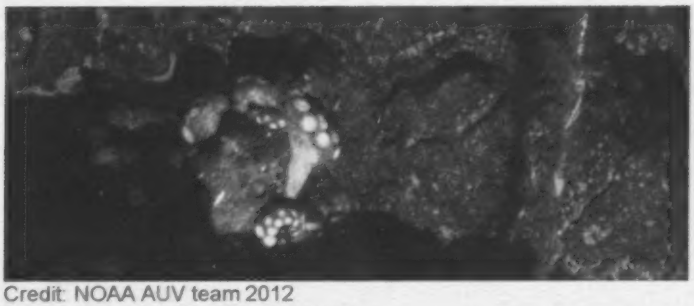
Crassadoma gigantea
Giant rock scallop

Authority: Gray 1825
Confidence: previously observed & collected [2,6]

Transect: DFO_6
Depths (m): 35-84

Credit: DFO PBS ROV team
Photo (top): 072112_231809_ 165.jpg
Photo (lower): 072112_234847_ 235.jpg

7. Phylum: Mollusca – bivalves, nudibranchs, octopus, & others
7.2. Class: Cephalopoda
7.2.1. Order: Octopoda – octopus



Credit: NOAA AUV team 2012
Photo: 20120724.155347.00025.jpg

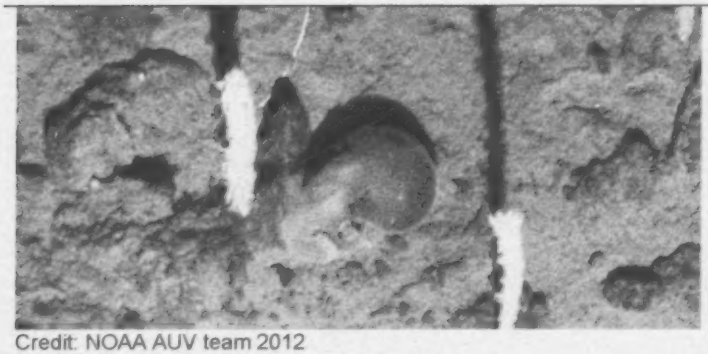
Family Octopodidae

Octopodidae sp.[1]
Unknown octopus

Authority: Cuvier 1798
Confidence: new record

Transcect: AUV_4
Depth (m): 436

[1]Likely a giant Pacific octopus (*Enteroctopus dofleini*) or a Pacific red octopus (*Octopus rubescens*).



Credit: NOAA AUV team 2012
Photo: 20120724.174948.01417.jpg

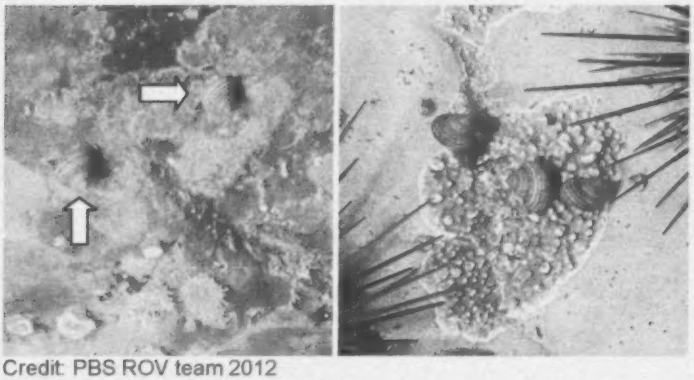
Family Octopodidae

Graneledone boreopacifica

Authority: Nesis 1982
Confidence: new record

Transcect: AUV_4
Depth (m): 1145

7. Phylum: Mollusca – bivalves, nudibranchs, octopus, & others
7.3. Class: Gastropoda
7.3.1. Order: Archaeogastropoda



Credit: PBS ROV team 2012
Photo (left): 072112_234847_ 235.jpg
Photo (right): 072112_232339_ 176.jpg

Family Calliostomatidae

***Calliostoma annulatum* & *Calliostoma ligatum*[1]**
Purple-ringed topsnail & blue topsnail

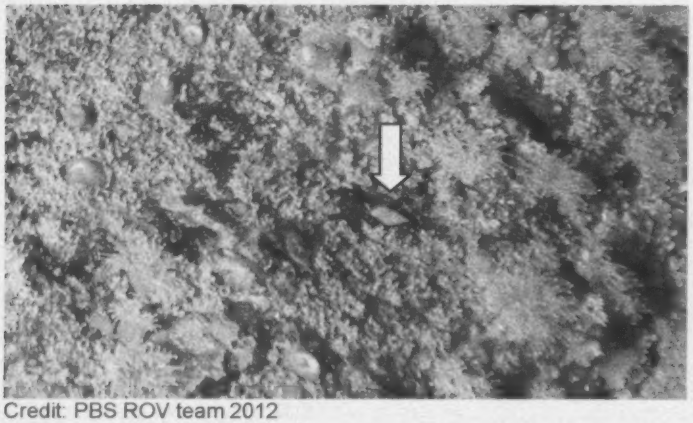
Authority: Lightfoot 1786 & Gould 1849
Confidence: both previously observed & collected [1,2,6]

Transects: DFO_4 & 6
Depths (m): 34-187[2]

[1]It is difficult to distinguish the two species owing to their similar morphologies, small size, and the limited resolution of the imagery.

[2]This range extends deeper than both the species' published maximum depths: 30 & 42 m (Lamb & Hanby 2005).

7. Phylum: Mollusca – bivalves, nudibranchs, octopus, & others
7.3. Class: Gastropoda
7.3.2. Order: Neogastropoda



Credit: PBS ROV team 2012
Photo: 072112_231108_ 151.jpg

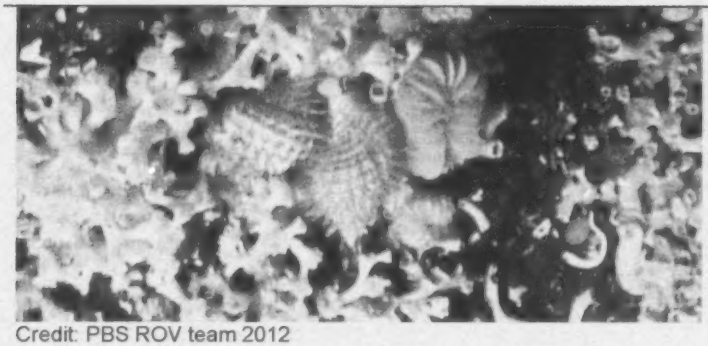
Family Muricidae

Ocinebrina lurida[1]
Lurid rocksnail

Authority: Middendorff 1848
Confidence: previously observed [1]

Transcects: DFO_4 & 6
Depths (m): 83-198

[1]Shallow observations may be of *Lirabuccinum dirum* (Reeve 1846) which has a similar morphology & has previously been observed & collected on the pinnacle [1,2,6].



Credit: PBS ROV team 2012
Video still: Pac2012-043_HD_7_26_2012_7_27_22 PM008.mpg

Family Ranellidae

Fusitriton oregonensis
Hairy triton

Authority: Redfield 1846
Confidence: previously observed & collected [1,2,6][1]

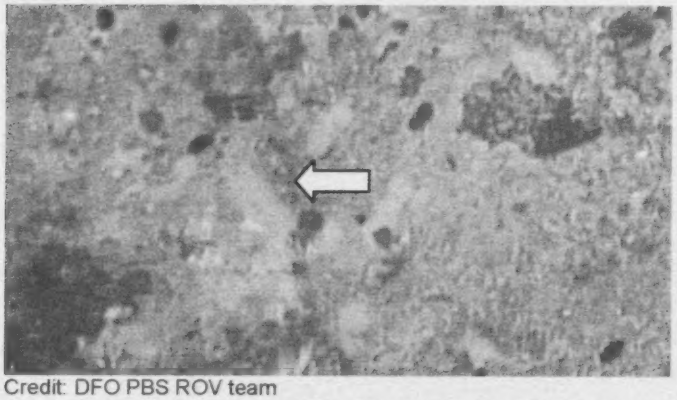
Transects: DFO_2, 3, 4, 5, 8, 9, 14, 15, 16, & 17
Depths (m): 139-223[2,3]

[1]Voucher specimen collected during the Cobb Seamount 2012 cruise.

[2]This range extends slightly deeper than the species' published maximum depth: 180 m (Lamb & Hanby 2005) but is within the depth range previously observed on Cobb Seamount (632 m; [6]).

[3]An unidentified white snail with similar morphology was also observed on AUV_4 from 532-558 m in depth.

7. Phylum: Mollusca – bivalves, nudibranchs, octopus, & others
7.3. Class: Gastropoda
7.3.3. Order: Nudibranchia



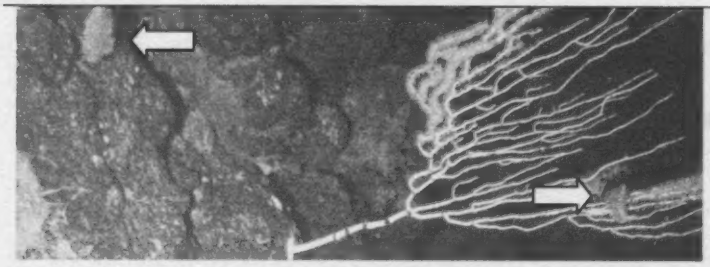
Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_21_2012_10_43_37 PM012.mpg

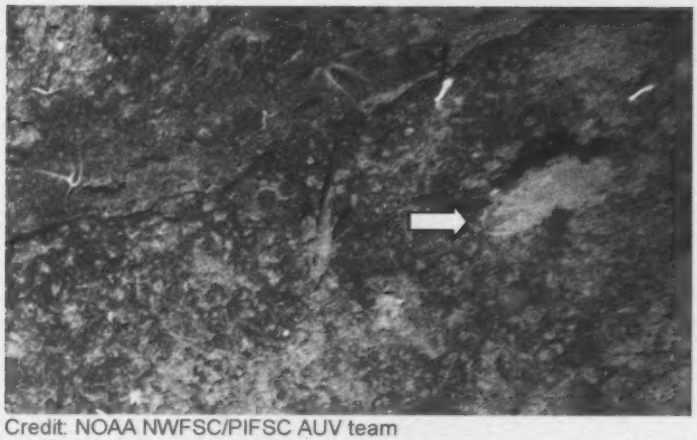
Family Doridiidae

Doris montereyensis
Monterey sea-lemon

Authority: Cooper 1863
Confidence: previously observed [1]

Transect: DFO_6
Depth (m): 35





Credit: NOAA NWFSC/PIFSC AUV team
Photo (top): 20120724.155847.00085.jpg
Photo (bottom): 20120723.154726.00455.jpg

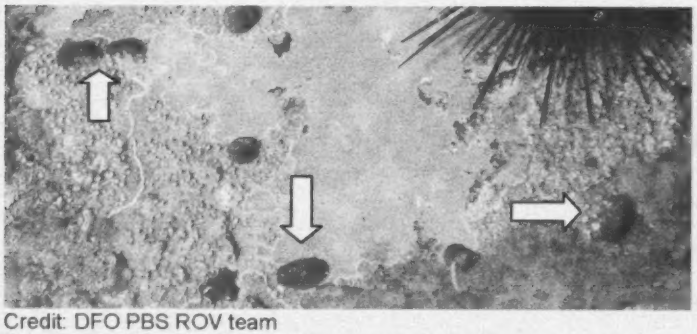
Family Tritoniidae

Tritoniidae sp.

Authority: Lamark 1809
Confidence: family previously collected [6]

Transects: AUV_2, 4, & 5
Depths (m): 485-1000

7. Phylum: Mollusca – bivalves, nudibranchs, octopus, & others
7.4. Class: Polyplacophora
7.4.1. Order: Lepidopleurida



Credit: DFO PBS ROV team
Photo: 072112_233009_ 189.jpg

Family Leptochitonidae

Leptochiton rugatus
Chiton

Authority: Pilsbry 1892
Confidence: genus & species previously collected [6, 7]

Transect: DFO_6
Depths (m): 34-84

8. Phylum: Brachiopoda - lampshells
8.1. Class: Rhynchonellata
8.1.1. Order: Terebratulida

Credit: DFO PBS ROV team
Photo: 072712_020346_ 976.jpg

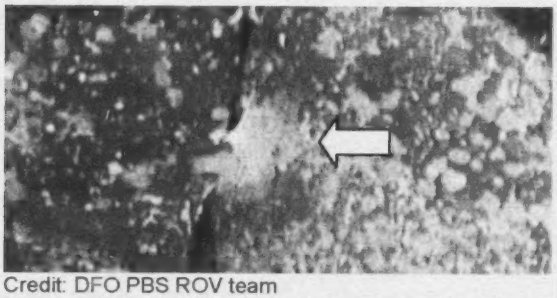
Family Laqueidae

Laqueus californianus
California lamp shell

Authority: Koch 1848
Confidence: previously observed & collected [2]

Transcects: DFO_2, 3, 4, 5, 6, 8, 9, 14, 15, 16, & 17
Depths (m): 90-224

9. Phylum: Bryozoa – moss animals



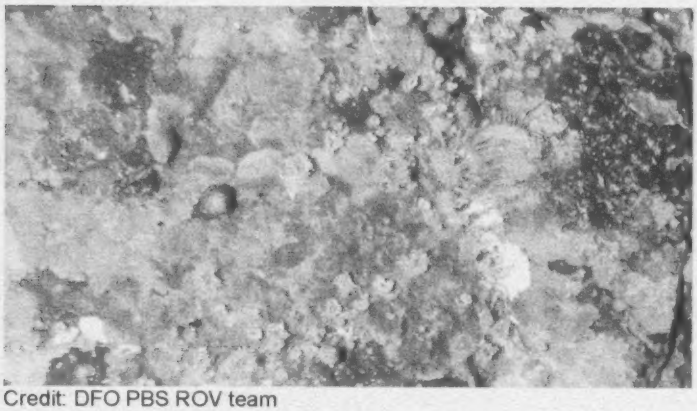
Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_27_2012_1_21_00 AM003.mpg

Bryozoa sp.

Confidence: new record

Transects: DFO_2, 5 & 17
Depths (m): 124-207

9. Phylum: Bryozoa – moss animals
9.1. Class: Gymnolaemata
9.1.1. Order: Cheilostomatida



Credit: DFO PBS ROV team
Photo: 072112_231839_ 166.jpg

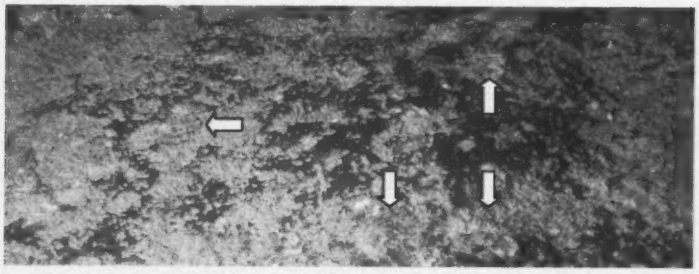
Family Cribrilinidae

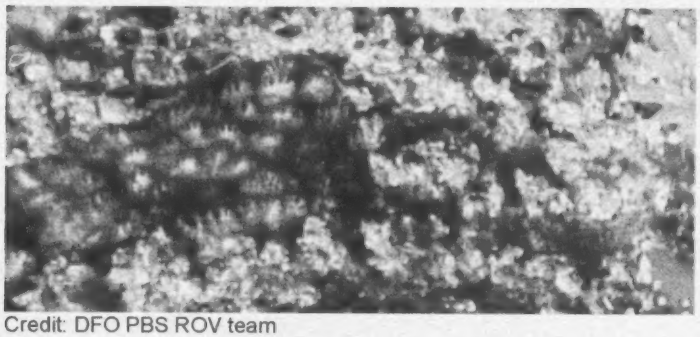
cf *Reginella hippocrepis*
Green encrusting bryozoa

Authority: Hincks 1882
Confidence: new record

Transect: DFO_2, & 6
Depths (m): 41-132

9. Phylum: Bryozoa – moss animals
9.2. Class: Stenolaemata
9.2.1. Order: Cyclostomatida





Credit: DFO PBS ROV team
Photo (top): 072112_231038_ 150.jpg
Video still (lower): Pac2012-043_HD_7_21_2012_10_43_37 PM004.mpg

Family Lichenoporidae

Disporella separata
Purple encrusting bryozoa

Authority: Osburn 1953
Confidence: new record[1]

Transect: DFO_6
Depths (m): 75-84

[1]Possibly the purple calcareous encrusting bryozoan *Borgiola pustulosa* described as predominant on the pinnacle by Birkeland (1971).

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others

10.1. Class: Asteroidea – sea stars

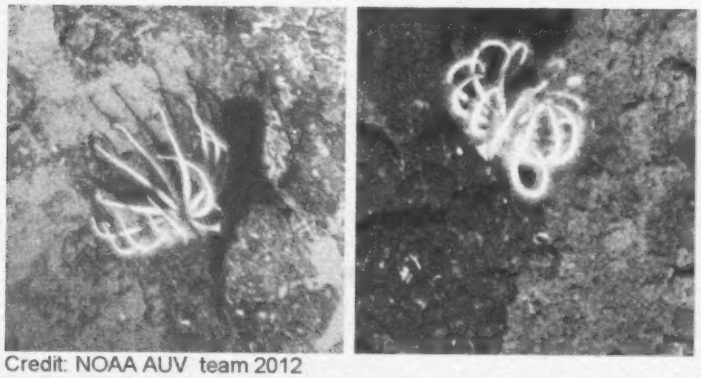
Asteroidea sp.
Unknown seastar[1]

Authority: de Blainville, 1830
Confidence: new record

Transects: DFO_4; SFU_5
Depths (m): 194-256

[1]May be *Nearchaster sp.*, which was previously reported from Cobb Seamount by Verena Tunnicliffe.

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.1. Class: Asteroidea – sea stars
10.1.1. Order: Brisingida



Credit: NOAA AUV team 2012
Photo (left): 20120722.035817.01423.jpg
Photo (right): 20120722.224725.00941.jpg

Family Brisingidae

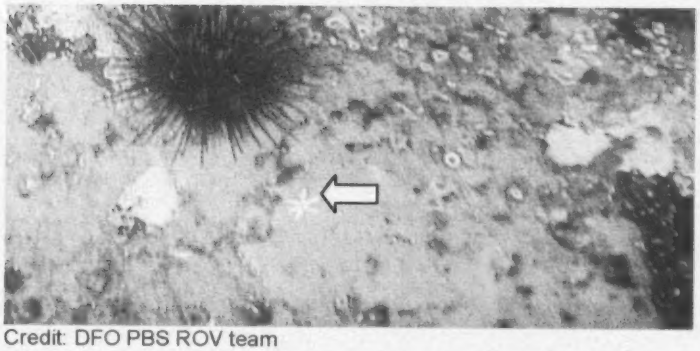
Brisingidae sp.

Authority: Fisher 1917
Confidence: family previously observed [6][1]

Transects: AUV_1, 2, 4 & 5
Depths (m): 536-1139

[1]Possibly *Brisinga* cf *synaptoma* (Fisher 1917; previously observed) or *Hymenodiscus* sp. (Asbjørnsen 1856); it is difficult to distinguish the two owing to their similar morphologies, small size, and the limited resolution of the imagery.

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.1. Class: Asteroidea – sea stars
10.1.2. Order: Forcipulatida



Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_21_2012_10_43_37 PM009.mpg

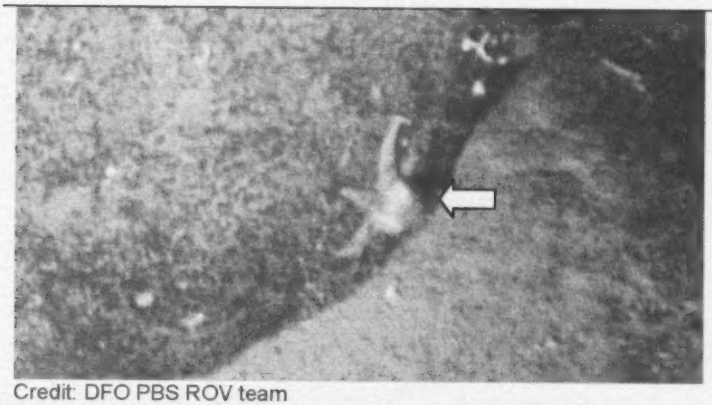
Family Asteriidae

Leptasterias hexactis
Six-rayed seastar

Authority: Stimpson 1862
Confidence: previously observed & collected [1,2,6]

Transects: DFO_6 & 14
Depths (m): 37-195[1]

[1]This range is deeper than the species' published range: intertidal to shallow subtidal (Lambert 2000).



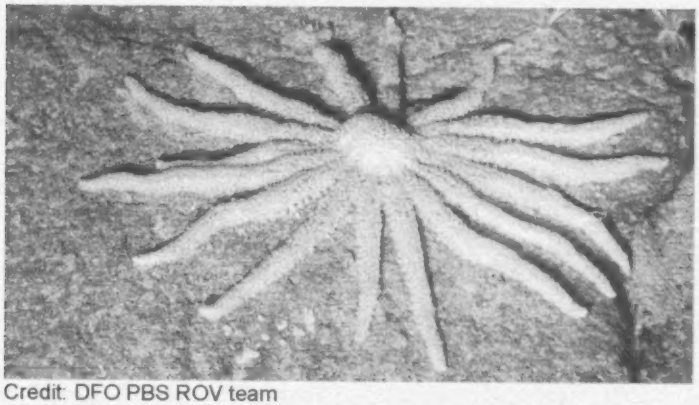
Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_22_2012_5_44_12 PM005.mpg

Family Asteriidae

Orthasterias koehleri
Long-armed seastar

Authority: deLoriol 1897
Confidence: previously observed & collected [1,6]

Transect: DFO_4
Depth (m): 196



Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_27_2012_1_21_00 AM007.mpg

Family Asteriidae

Rathbunaster californicus
Deep-sea sunflower star

Authority: Fisher 1906
Confidence: new record

Transects: DFO_1, 3, 4, 5, 8, 9, 14, 15, 16, & 17; SFU_3, & 5; AUV_4
Depths (m): 102-617

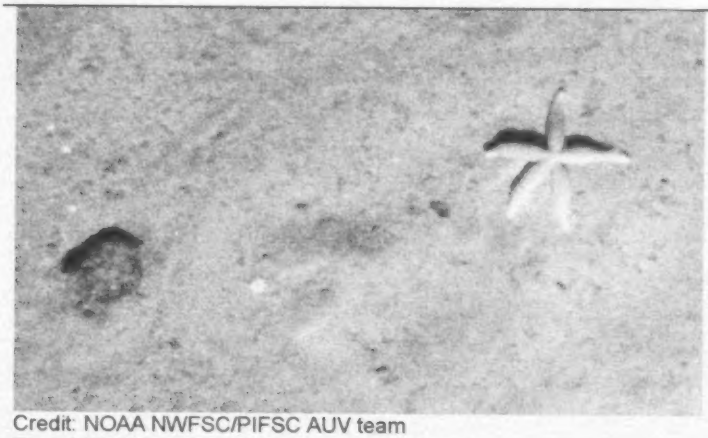
Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_23_2012_2_20_58 AM009.mpg

Family Asteriidae

Stylasterias forreri
Velcro star

Authority: deLoriol 1887
Confidence: previously observed [6]

Transects: DFO_3, 4, & 14
Depths (m): 180-202



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.232835.01435.jpg

Family Pedicellasteridae

***Ampheraster* sp.**

Authority: Fisher 1923
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 544-944

Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_21_2012_8_41_07 PM006.mpg

Family Pycnopodiidae

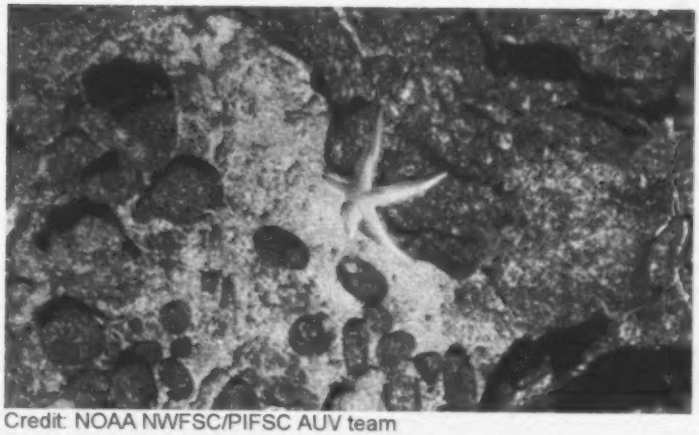
Pycnopodia helianthoides
Sunflower star

Authority: Brandt 1835
Confidence: previously observed [1,2,6]

Transects: DFO_2, 6, 14, & 15
Depths (m): 84-177[1]

[1]This range extends slightly deeper than the species' published maximum depth: 120 m (Lambert 2000).

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.1. Class: Asteroidea – sea stars
10.1.3. Order: Paxillosida



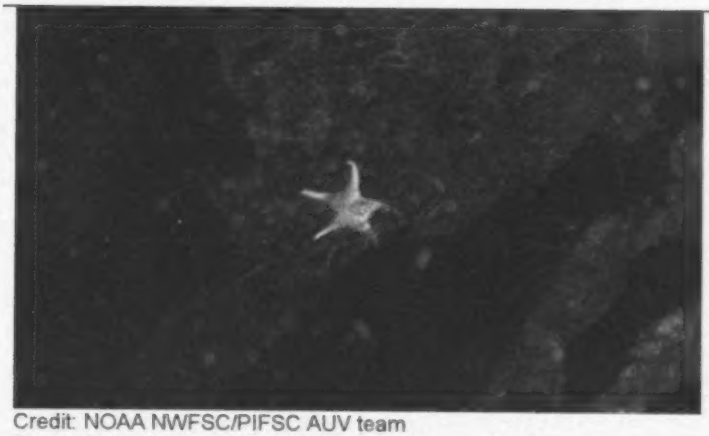
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.155307.00017.jpg

Family Astropectinidae

***Thrissacanthias* sp.**

Authority: Fisher 1910
Confidence: new record

Transect: AUV_4
Depths (m): 436-562



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120724.160027.00105.jpg

Family Pseudarchasteridae

***Pseudarchaster* sp.**

Authority: Sladen 1889
Confidence: genus previously observed [6][1]

Transects: AUV_1, 2, 4, & 5
Depths (m): 436 – 790

[1]Could be *Mediaster* sp. (Family Goniasteridae, Order Valvatida; Stimpson 1857)

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
11.0. Class: Asteroidea – sea stars
10.1.4. Order: Spinulosida

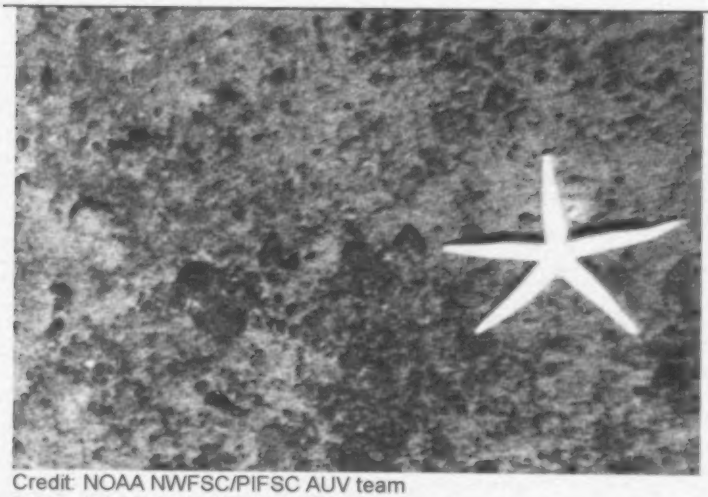
Credit: DFO PBS ROV team
Photo (left): 072112_234632_ 226.jpg
Video Still (right): Pac2012-043_HD_7_21_2012_10_43_37 PM012.mpg

Family Echinasteridae

Henricia leviuscula
Blood star

Authority: Stimpson 1857
Confidence: previously observed & collected [1,2,6]

Transect: DFO_6
Depths (m): 37-91



Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.030306.00761.jpg

Family Echinasteridae

Henricia sanguinolenta
Fat blood star

Authority: Müller 1776
Confidence: previously collected [2,6]

Transects: DFO_2, 3, 4, 5, 8, 9, 14, 15, & 17; SFU_3, & 5; AUV_1
Depths (m): 111-726

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.1. Class: Asteroidea – sea stars
10.1.5. Order: Valvatida

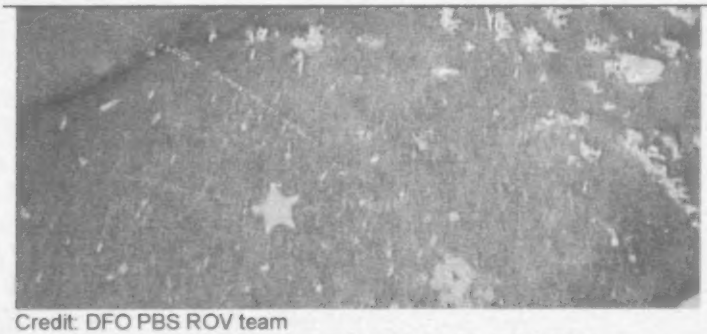
Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_26_2012_5_08_15 PM003.mpg

Family Goniasteridae

Ceramaster patagonicus
Cookie star

Authority: Sladen 1889
Confidence: new record

Transects: DFO_2, 3, 4, 5, 8, 14, 15, & 17
Depths (m): 110-217



Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_22_2012_5_44_12 PM004.mpg

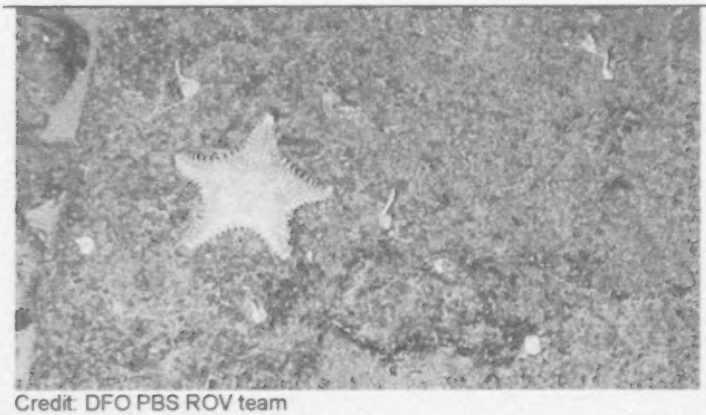
Family Goniasteridae

Ceramaster* cf *stellatus[1]

Authority: Djakonov 1950
Confidence: new record

Transects: DFO_3, 4, 5, 8, 9, 14, & 16
Depths (m): 172-218

[1]This taxon has a similar shape to *Hippasteria* sp. but lacks spines.



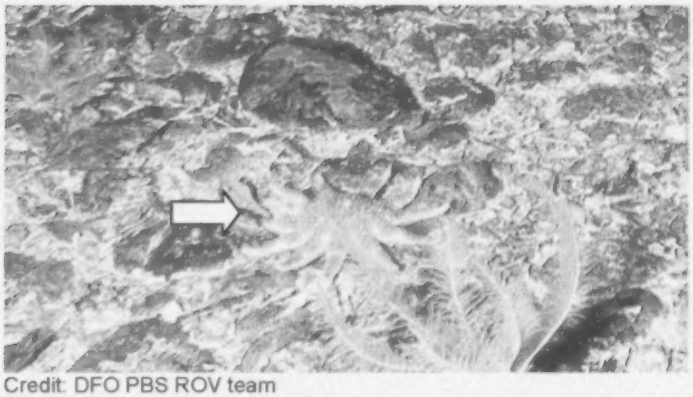
Credit: DFO PBS ROV team
Photo: 072312_033317_ 284.jpg

Family Goniasteridae

Hippasteria phrygiana
Spiny seastar

Authority: Parelius 1768
Confidence: previously observed [2,6]

Transects: DFO_3, 4, 9, & 17; AUV_1, 2, & 5
Depths (m): 162-855



Credit: DFO PBS ROV team
Photo: 072112_230739_ 144.jpg

Family Solasteridae

Crossaster papposus
Rose star

Authority: Linnaeus 1767
Confidence: previously observed & collected [1,2,6]

Transcects: DFO_3, 5, 6, 8, & 17
Depths (m): 84-220

Credit: DFO PBS ROV team
Photo: 072312_223522_ 344.jpg

Family Solasteridae

Lophaster furcilliger
Crested seastar

Authority: Fisher 1905
Confidence: new record

Transcects: DFO_6 & 15
Depths (m): 95-154[1]

[1]This minimum depth is shallower than the species' published min. depth (350 m) but within the range of *L. furcilliger vexator* (21 m; Lambert 2000).

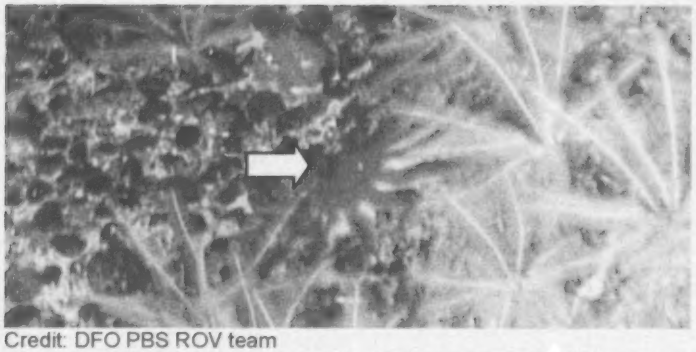
Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_26_2012_5_08_15 PM003.mpg

Family Solasteridae

Solaster* cf *endeca
Northern sun star

Authority: Linnaeus 1771
Confidence: new record but genus previously observed [2,6]

Transects: DFO_1, 2, 3, 5, 14, 15, & 17; SFU_5
Depths (m): 123-255



Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_21_2012_10_43_37 PMU02.mpg

Family Solasteridae

Solaster stimpsoni
Striped sun star

Authority: Verrill 1880
Confidence: new record but genus previously observed [2,6]

Transect: DFO_6
Depth (m): 91[1]

[1]This depth is slightly deeper than the species' published maximum depth: 60 m (Lambert 2000).

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.1. Class: Asteroidea – sea stars
10.1.6. Order: Velatida

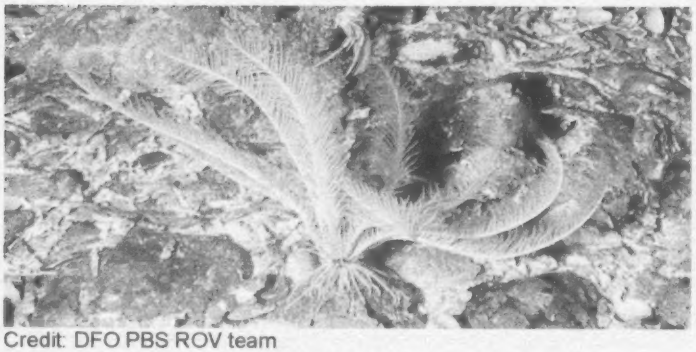
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.154536.00433.jpg

Family Pterasteridae

***Pteraster* sp.**
Authority: Müller & Troschel 1842
Confidence: genus previously observed [6]

Transcects: AUV_1, 2, 4, & 5
Depths (m): 539-930

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.2. Class: Crinoidae – crinoids
10.2.1. Order: Comatulida



Credit: DFO PBS ROV team
Photo: 072112_230709_ 143.jpg

Family Antedonidae

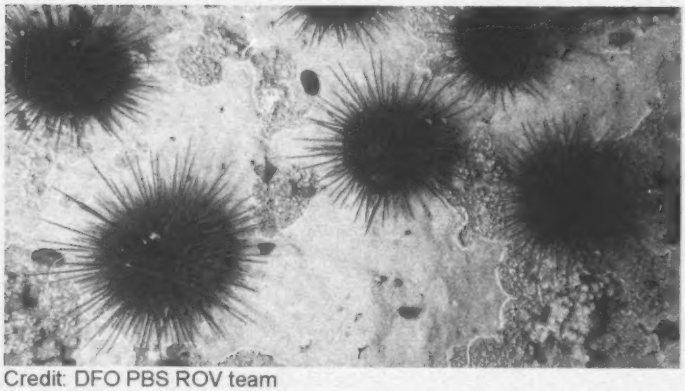
Florometra serratissima
Feather star or crinoid

Authority: Clark 1907
Confidence: previously observed & collected [2,6][1]

Transcects: DFO_2, 3, 4, 6, 8, 9, 15, 16, & 17; AUV_2, & 4
Depths (m): 84-749

[1]Voucher specimens collected during the Cobb Seamount 2012 cruise.

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.3. Class: Echinoidea – urchins
10.3.1. Order: Camarodonta



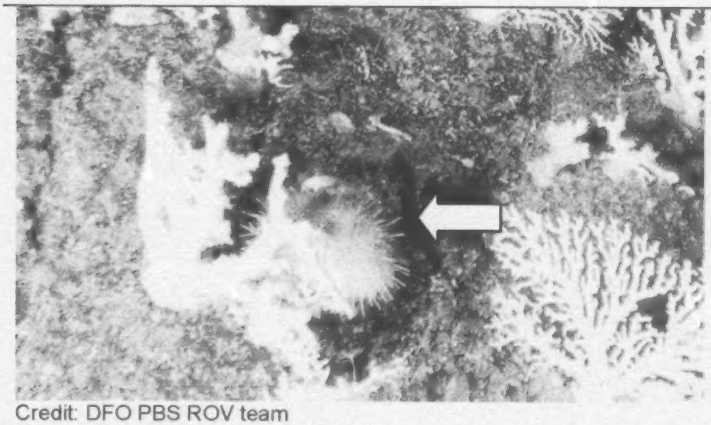
Credit: DFO PBS ROV team
Photo: 072112_234847_ 235.jpg

Family
Strongylocentrotidae

Mesocentrotus franciscanus
Red urchin

Authority: Agassiz 1863
Confidence: previously observed & collected [1,2,6]

Transect: DFO_6
Depths (m): 35-95



Credit: DFO PBS ROV team
Photo: 072212_183956_ 204.jpg

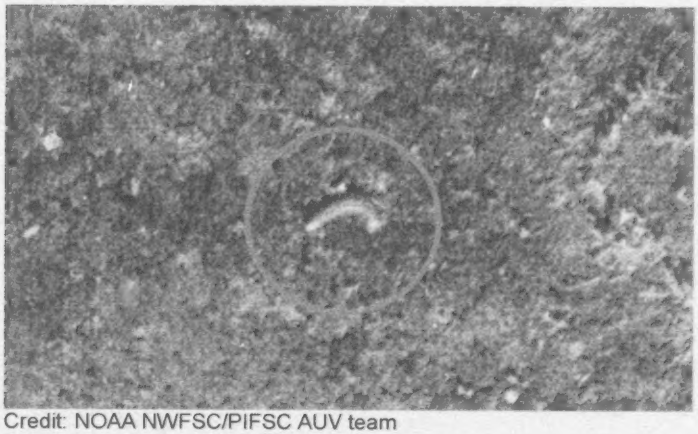
Family
Strongylocentrotidae

Strongylocentrotus pallidus
Pale urchin

Authority: Sars 1871
Confidence: previously collected [6]

Transects: DFO_3, 5, 14, 15, & 17
Depths (m): 160-208

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.4. Class: Holothuroidea – sea cucumbers
10.4.1. Order: Aspidochirotida



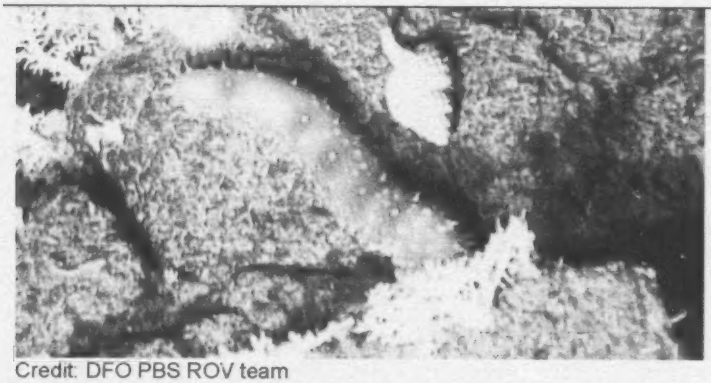
Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120722.022756.00339.jpg

Family Molpadiidae

***Molpadia* sp.**

Authority: Cuvier 1817
Confidence: new record

Transcect: AUV_1
Depth (m): 678



Credit: DFO PBS ROV team
Video Still: Pac2012-043_HD_7_23_2012_2_20_58 AM010.mpg

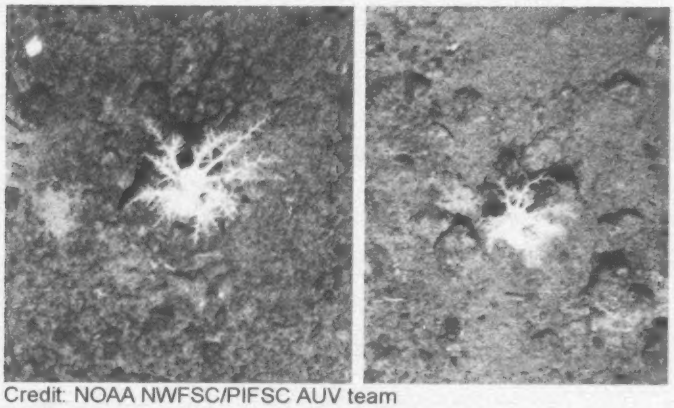
Family Stichopodidae

Apostichopus leukothele
White-spined sea cucumber

Authority: Lambert 1986
Confidence: previously collected [2,6]

Transects: DFO_1, 2, 3, 4, 5, 8, 9, 14, 15, & 17; SFU_3
Depths (m): 93-259

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.4. Class: Holothuroidea – sea cucumbers
10.4.2. Order: Dendrochirotida



Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120722.222225.00641.jpg
Photo (right): 20120722.225035.00979.jpg

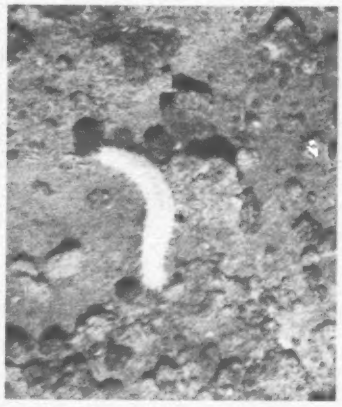
Family Psolidae

Psolus squamatus
Sessile sea cucumber

Authority: Lütken 1857
Confidence: previously collected [6]

Transects: AUV_2, 4, & 5
Depths (m): 527-943

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.4. Class: Holothuroidea – sea cucumbers
10.4.3. Order: Elasipodida



Credit: NOA AUV team 2012
Photo (left): 20120722.030036.00731.jpg
Photo (right): 20120722.214004.00133.jpg

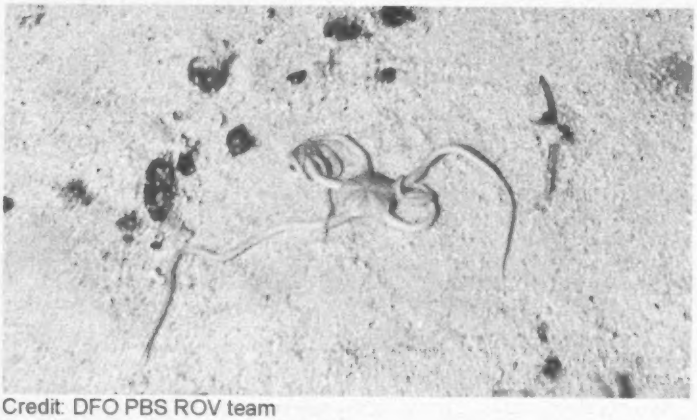
Family Laetmogonidae

Pannychia* cf *moseleyi
White sea cucumber

Authority: Théel 1882
Confidence: new record

Transects: AUV_1, 2, 4, & 5
Depths (m): 533-937

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.5. Class: Ophiuroidea – brittle stars
10.5.1. Order: Euryalida



Credit: DFO PBS ROV team
Photo (top): 072612_200009_ 389.jpg
Photo (lower): 072312_201952_ 49.jpg

Family Asteronychidae

Asteronyx loveni

Authority: Müller & Troschel 1842
Confidence: new record[1]

Transects: DFO_1, 3, 4, 5, 8, 15, & 16; SFU_3, & 5
Depths (m):165-259

[1]Voucher specimens collected during the Cobb Seamount 2012 cruise.

10. Phylum: Echinodermata – sea stars, sea cucumbers, & others
10.5. Class: Ophiuroidea – brittle stars
10.5.2. Order: Ophiurida

Credit: PBS ROV & NOAA AUV teams
Video Still (left): Pac2012-043_HD_7_26_2012_2_49_54 PM008.mpg
Photo (right): 20120724.161317.00259.jpg

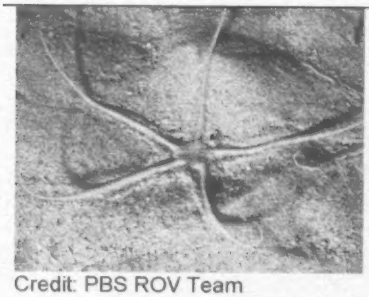
Family Ophiacanthidae

Ophiopholis bakeri

Authority: McClendon 1909
Confidence: previously collected [6]

Transects: DFO_2, 3, 4, 5, 8, 14, 15, 16, & 17; AUV_2, & 4
Depths (m): 102-707[1]

[1]Brittle stars were not systematically counted on AUV transects; depth range may be greater.



Credit: PBS ROV Team
Video still (left): Pac2012-043_HD_7_26_2012_7_27_22 PM001.mpg
Video still (right): Pac2012-043_HD_7_26_2012_7_27_22 PM001.mpg

Family Ophiuridae

Ophiura sarsii
Notched brittle star

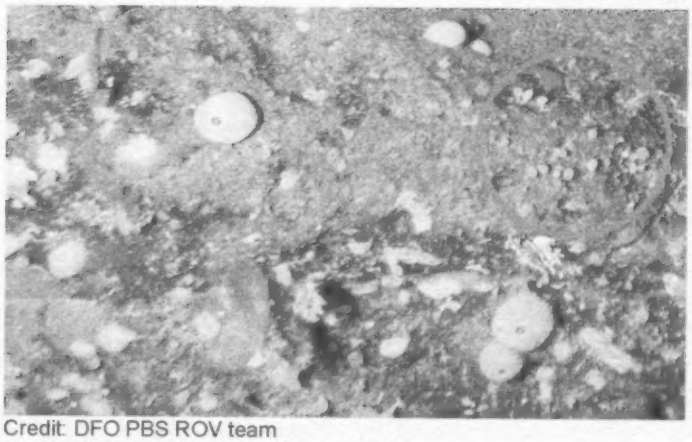
Authority: Lütken 1855
Confidence: previously collected [6][1]

Transects: DFO_1, 3, 4, 8, 9, 15, & 16; SFU_3, & 5
Depths (m): 166-259[2]

[1]Voucher specimens collected during the Cobb Seamount 2012 cruise.

[2]Brittle stars were not systematically counted on AUV transects; depth range may be greater.

11. Phylum: Chordata
11.1. Class: Ascidiacea



Credit: DFO PBS ROV team
Photo: 072612_174203_ 131.jpg

Ascidiacea sp.
White tunicate

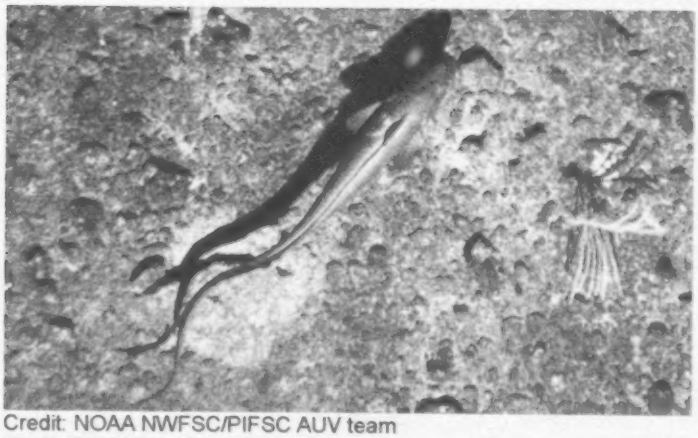
Confidence: new record

Transects: DFO_2, 4, 5, 6, 8, 14, 15, & 17
Depths (m): 34-209

11. Phylum: Chordata

11.2. Class: Actinopterygii – ray-finned fishes

11.2.1. Order: Gadiformes – grenadiers or rattails



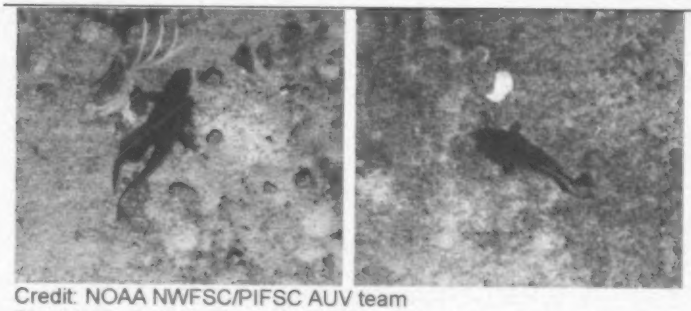
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.222745.00705.jpg

Family Macrouridae

cf Coryphaenoides acrolepis
Pacific grenadier

Authority: Bean 1884
Confidence: new record

Transcects: AUV_1, 2, 4, & 5
Depths (m): 608-1154



Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120724.173918.01291.jpg
Photo (right): 20120722.025016.00607.jpg

Family Moridae

Antimora microlepis
Finescale mora

Authority: Bean 1880
Confidence: previously observed [6]

Transects: AUV_1, & 4
Depths (m): 720-1118

11. Phylum: Chordata
11.2. Class: Actinopterygii – ray-finned fishes
11.2.2. Order: Perciformes

Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_26_2012_2_49_54 PM003.mpg

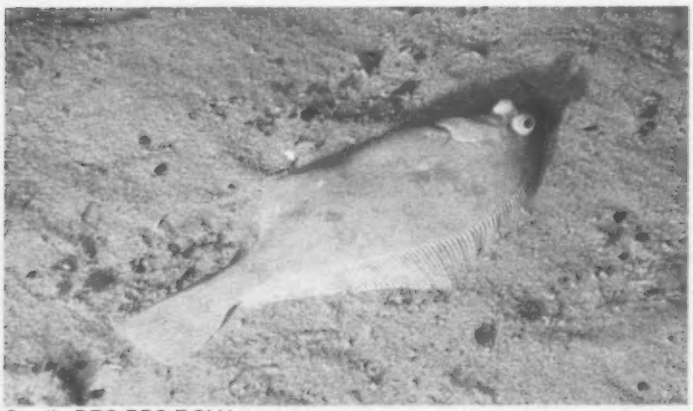
Family Stichaeidae

Chirolophis decoratus
Decorated warbonnet

Authority: Jordan & Snyder 1902
Confidence: new record

Transects: DFO_2, 3, & 14
Depths (m):132-196

11. Phylum: Chordata
11.2. Class: Actinopterygii – ray-finned fishes
11.2.3. Order: Pleuronectiformes – flatfishes



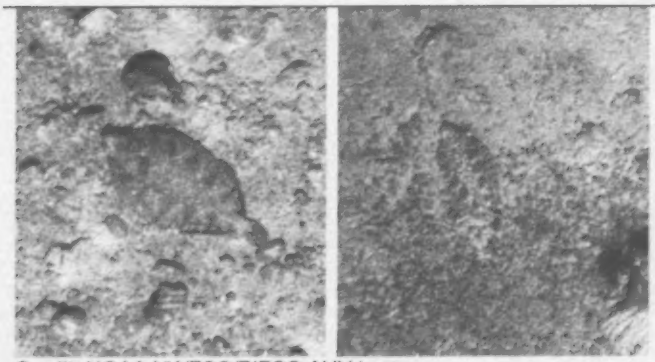
Credit: DFO PBS ROV team
Photo: 072312_202237_ 60.jpg

Family Paralichthyidae

Citharichthys sordidus
Pacific sanddab

Authority: Girard 1854
Confidence: new record

Transect: DFO_1
Depths (m): 194-198



Credit: NOAA NWFSC/PIFSC AUV team
Photo (left): 20120722.225725.01061.jpg
Photo (right): 20120722.034716.01291.jpg

Family Pleuronectidae

Embassichthys bathybius
Deep-sea sole

Authority: Gilbert 1890
Confidence: new record but genus previously observed [2,6]

Transects: AUV_1, 2, 4, & 5
Depths (m): 436-932

Credit: DFO PBS ROV team
Photo: 072612_200539_ 411.jpg

Family Pleuronectidae

Glyptocephalus zachirus
Rex sole

Authority: Lockington 1879
Confidence: previously collected [3]

Transects: DFO_1, & 16; AUV_1
Depths (m): 194-645

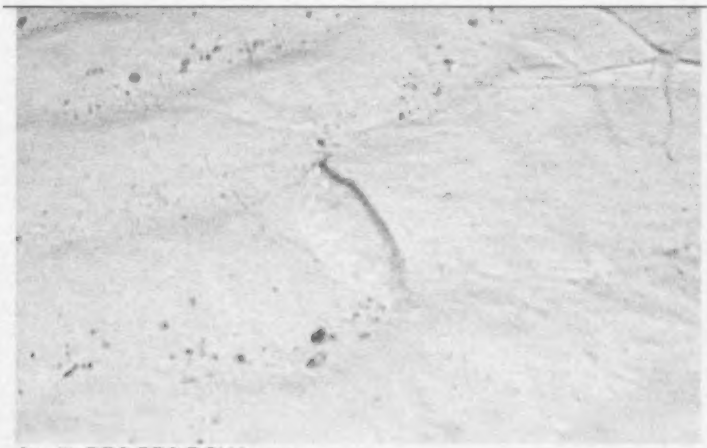
Credit: DFO PBS ROV team
Photo: 072312_204322_ 143.jpg

Family Pleuronectidae

Lepidopsetta bilineata
Rock sole

Authority: Ayres 1855
Confidence: previously collected [3]

Transcects: DFO_1, 2, 3, 6, & 16; SFU_5
Depths (m): 84-244



Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_23_2012_8_07_06 PM.mpg

Family Pleuronectidae

Microstomus pacificus
Dover sole

Authority: Lockington 1879
Confidence: previously collected [3]

Transcects: DFO_1; AUV_1
Depths (m): 199-627

11. Phylum: Chordata
11.2. Class: Actinopterygii – ray-finned fishes
11.2.4. Order: Scorpaeniformes

Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_21_2012_8_41_07 PM005.mpg

Family Agonidae

Agonopsis vulsa
Northern spearnose poacher

Authority: Jordan & Gilbert 1880
Confidence: new record

Transect: DFO_2
Depth (m): 137

Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120722.231505.01273.jpg

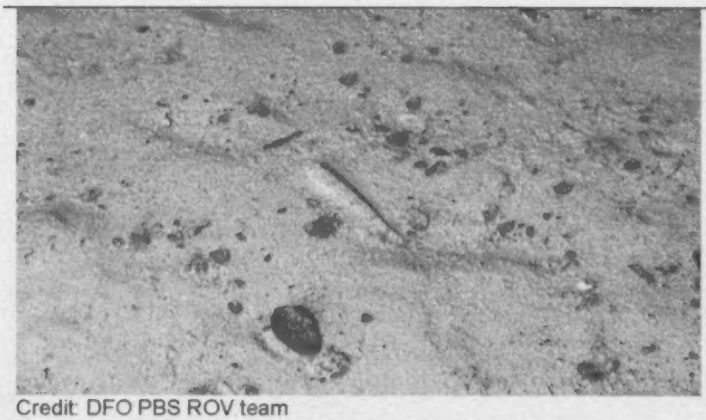
Family Anoplopomatidae

Anoplopoma fimbria
Sablefish

Authority: Pallas 1814
Confidence: previously observed & collected[1] [3,5,6]

Transect: AUV_5
Depths (m): 903-937

[1]A fishery at Cobb Seamount (Douglas 2011)



Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_23_2012_8_07_06 PM004.mpg

Family Cottidae

Cottidae sp.
Unknown sculpin

Confidence: unknown species within family previously observed & collected [2,6]

Transects: DFO_1, 2, 3, 4, 5, 6, 8, 14, 15, 16, & 17
Depths (m): 91-223

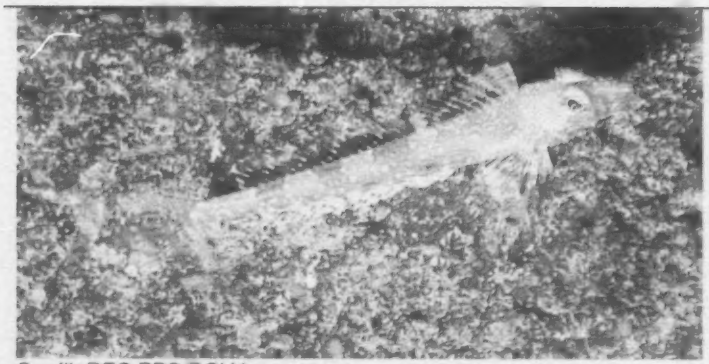
Credit: DFO PBS ROV team
Photo: 072112_230108_ 131.jpg

Family Cottidae

Hemilepidotus spinosus
Brown Irish lord

Authority: Ayres 1854
Confidence: previously observed & collected [1,2,6]

Transects: DFO_2 & 6
Depths (m): 90-126



Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_23_2012_2_20_58 AM012.mpg

Family Cottidae

Paricelinus hopliticus
Thornback sculpin

Authority: Eigenmann & Eigenmann 1889
Confidence: new record

Transects: DFO_1, 2, 3, 4, 5, 6, 8, 14, 15, 16, & 17; SFU_5
Depths (m): 91-256

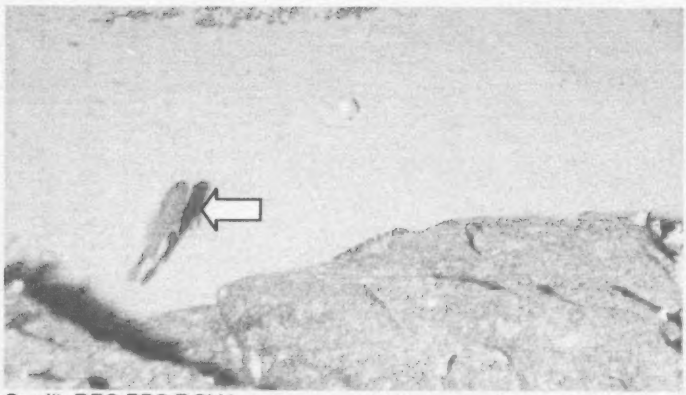
Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_26_2012_7_27_22 PM011.mpg

Family Rhamphocottidae

Rhamphocottus richardsonii
Grunt sculpin

Authority: Günther 1874
Confidence: new record

Transect: DFO_16
Depth (m): 184



Credit: DFO PBS ROV team
Photo: 072312_024632_ 97.jpg

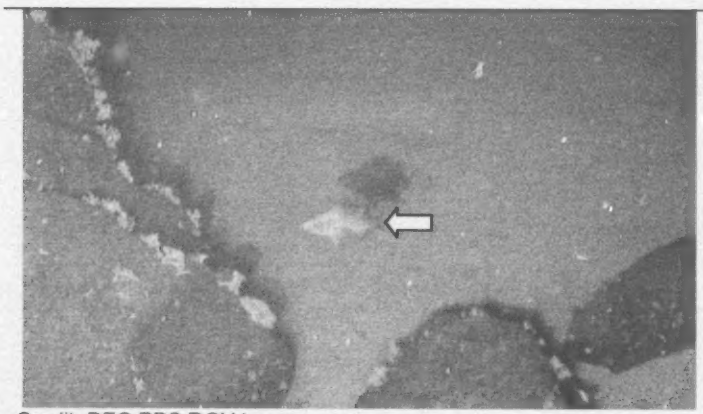
Family Scorpaenidae

***Sebastes* spp.**
Rockfish[1]

Authority: Cuvier 1829
Confidence: previously observed & collected [1,2,3, 5]

Transects: DFO_2, 3, 4, 5, 6, 8, 9, 14, 15, 16, & 17; SFU_3; AUV_4, & 5
Depths (m): 84-555

[1]A rockfish unidentifiable to species-level owing to its life stage (e.g. juveniles) or to poor image quality (e.g. distance, camera angle, water visibility, etc.).



Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_22_2012_5_44_12 PM004.mpg

Family Scorpaenidae

Sebastes alutus
Pacific Ocean perch

Authority: Gilbert 1890
Confidence: new record

Transects: DFO_3, 5, & 17; SFU_3
Depths (m): 164-258

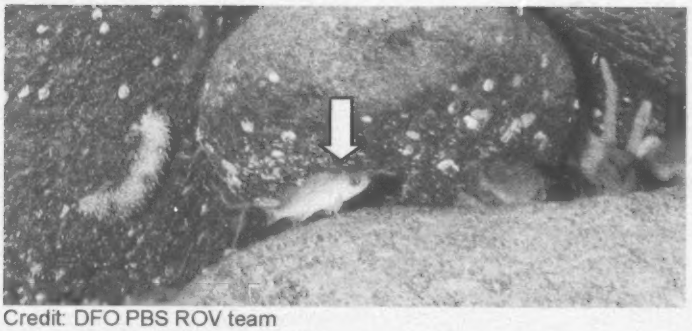
Credit: DFO PBS ROV team
Photo: 072612_215213_ 552.jpg

Family Scorpaenidae

Sebastes elongatus
Greenstripe rockfish

Authority: Ayres 1859
Confidence: new record

Transect: DFO_9
Depths (m): 214-215



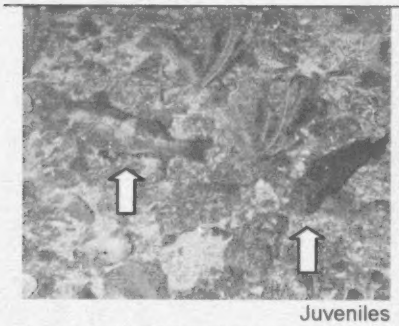
Credit: DFO PBS ROV team
Photo: 072612_022036_ 181.jpg

Family Scorpaenidae

Sebastes emphaeus
Puget Sound rockfish

Authority: Starks 1911
Confidence: new record

Transcects: DFO_2, 3, 4, 5, 8, 9, 14, 15, 16, & 17
Depths (m): 93-222



Juveniles

Adult

Credit: DFO PBS ROV team
Photo (left): 072112_230639_ 142.jpg
Photo (right): 072112_231639_ 162.jpg

Family Scorpaenidae

Sebastes entomelas
Widow rockfish

Authority: Jordan & Gilbert 1880
Confidence: previously observed & collected[1] [1,2,4,6]

Transcects: DFO_2, 3, 6, & 15
Depths (m): 37-198

[1]A fishery at Cobb Seamount (Douglas 2011)

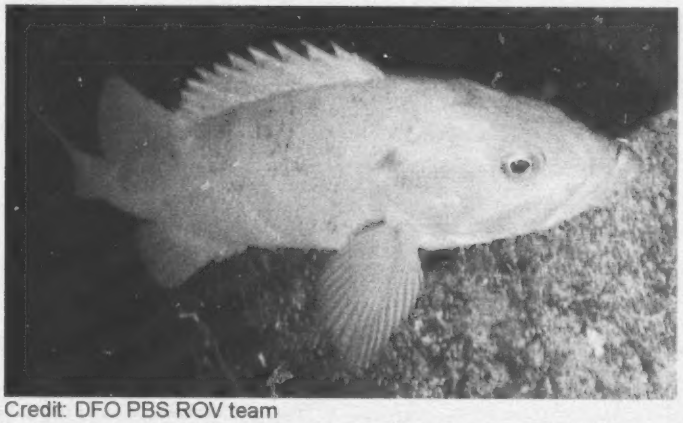
Credit: DFO PBS ROV team
Video still (left): Pac2012-043_HD_7_27_2012_1_21_00 AM007.mpg
Photo (right): 072612_155146_ 213.jpg

Family Scorpaenidae

Sebastes helvomaculatus
Rosethorn rockfish

Authority: Ayres 1859
Confidence: previously observed & collected [2,3,6]

Transcects: DFO 2, 3, 4, 5, 6, 8, 9, 14, 15, 16, & 17; SFU_3
Depths (m): 84-259



Credit: DFO PBS ROV team
Video still (top): Pac2012-043_HD_7_26_2012_1_33_45 AM006.mpg
Video still (lower): Pac2012-043_HD_7_26_2012_1_33_45 AM009.mpg

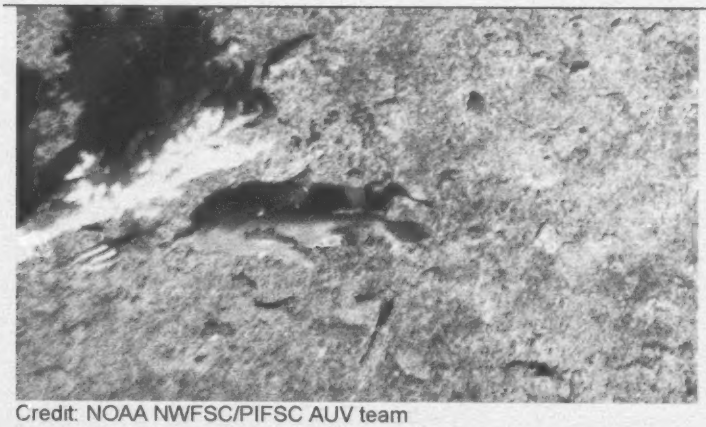
Family Scorpaenidae

Sebastes melanostictus* & *Sebastes aleutianus
Blackspotted-rougheye rockfish complex[1]

Authority: Matsubara 1934 & Jordan & Evermann 1898
Confidence: *S. melanostictus* new record; *S. aleutianus* previously observed & collected [3,6]

Transects: DFO_2, 3, 4, 5, 8, 14, & 17; SFU_2
Depths (m): 107-373

[1]There is a history of confusing and misidentifying blackspotted rockfish and rougheye rockfish owing to similar geographic distributions, depth ranges, and morphologies (Orr & Hawkins 2008; Love et al. 2002; Butler et al. 2012). There is also evidence of hybridization between the two species (Orr & Hawkins 2008). It is particularly difficult to identify individuals underwater.



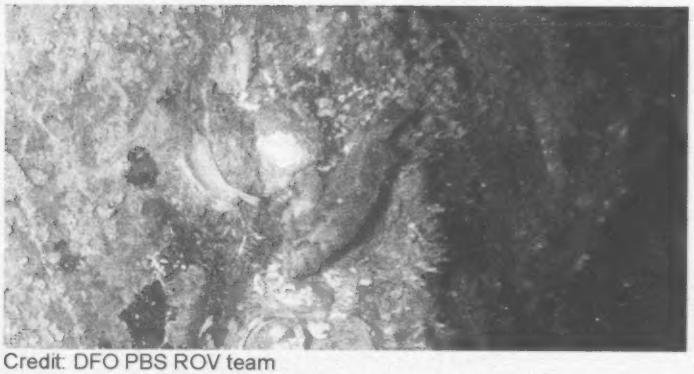
Credit: NOAA NWFSC/PIFSC AUV team
Photo: 20120723.155116.00501.jpg

Family Scorpaenidae

Sebastes melanostomus
Blackgill rockfish

Authority: Eigenmann & Eigenmann 1890
Confidence: new record

Transect: AUV_2
Depth (m): 556



Credit: DFO PBS ROV team
Photo: 072112_231909_ 167.jpg

Family Scorpaenidae

Sebastes mystinus
Blue rockfish

Authority: Jordan & Gilbert 1881
Confidence: previously collected [3]

Transect: DFO_6
Depth (m): 84

Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_21_2012_10_43_37 PM006.mpg

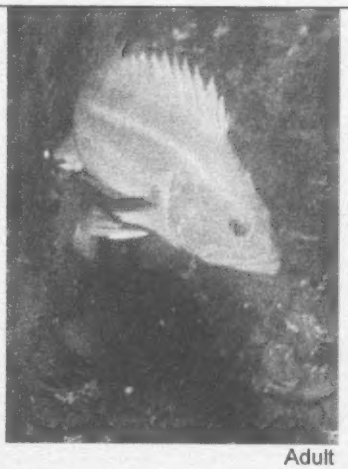
Family Scorpaenidae

Sebastes rosaceus
Rosy rockfish

Authority: Girard 1854
Confidence: previously collected [3,4]

Transects: DFO_2, 3, 4, 5, 6, 8, 14, 16, & 17
Depths (m): 35-219

Juvenile



Adult

Credit: DFO PBS ROV team
Video still (left): Pac2012-043_HD_7_26_2012_5_08_15 PM007.mpg
Photo (right): 072112_232439_ 178.jpg

Family Scorpaenidae

Sebastes ruberrimus
Yelloweye rockfish

Authority: Cramer 1895
Confidence: previously observed & collected [1,2,3,6]

Transects: DFO_2, 3, 4, 6, 8, 15, & 17
Depths (m): 84-221

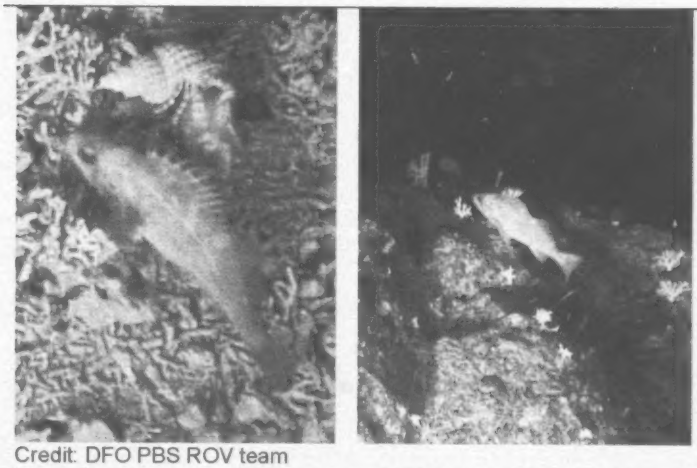
Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_26_2012_2_49_54 PM007.mpg

Family Scorpaenidae

Sebastes variegatus
Harlequin rockfish

Authority: Quast 1971
Confidence: previously collected [3,4]

Transects: DFO_2, 3, 4, 5, 8, 14, & 17; SFU_3
Depths (m): 91-258



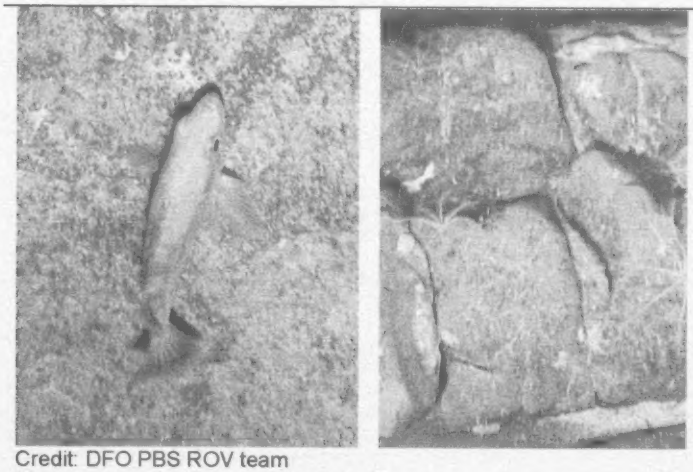
Credit: DFO PBS ROV team
Video still (left): Pac2012-043_HD_7_26_2012_2_49_54 PM005.mpg
Video still (right): Pac2012-043_HD_7_22_2012_6_34_51 PM002.mpg

Family Scorpaenidae

Sebastes wilsoni
Pygmy rockfish

Authority: Gilbert 1915
Confidence: new record

Transects: DFO_2, 3, 4, 5, 8, 14, 15, & 17
Depths (m): 110-221



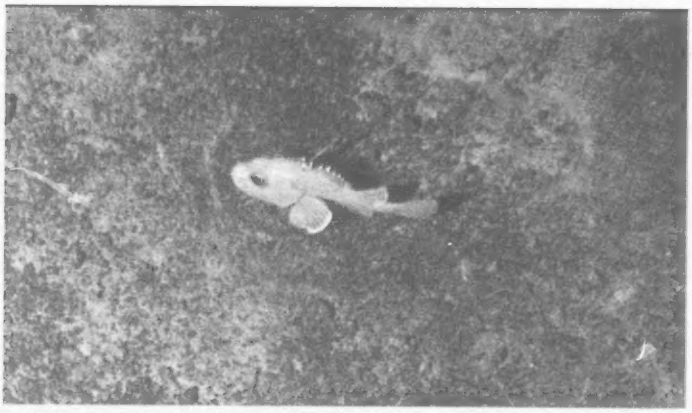
Credit: DFO PBS ROV team
Photo (left): 072212_175640_ 31.jpg
Video still (right): Pac2012-043_HD_7_21_2012_8_41_07 PM004.mpg

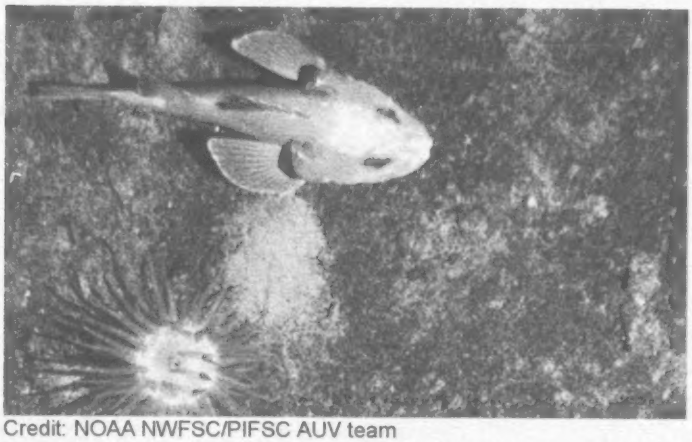
Family Scorpaenidae

Sebastes zacentrus
Sharpchin rockfish

Authority: Gilbert 1890
Confidence: new record

Transects: DFO_2, 3, 4, 5, 8, 14, 15, 16, & 17; SFU_3
Depths (m): 92-258





Credit: NOAA NWFSC/PIFSC AUV team
Photo (top, *S. alascanus*): 20120722.034536.01271.jpg
Photo (lower): 20120722.031146.00864.jpg

Family Scorpaenidae

***Sebastolobus* spp.**
Thornyhead[1]

Authority: Gill 1881
Confidence: new record

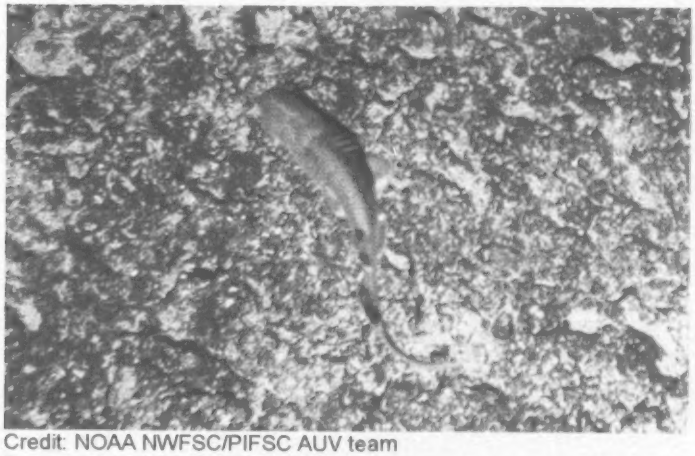
Transects: AUV_1, 2, 4, and 5
Depths (m): 436-1147

[1]There is a history of confusing and misidentifying the shortspine thornyhead (*Sebastolobus alascanus*; Bean 1890) and longspine thornyhead (*Sebastolobus altivelis*); Gilbert 1986) owing to similar geographic distributions, depth ranges, and morphologies (Love et al. 2002; Butler et al. 2012). It is particularly difficult to identify individuals underwater & from an overhead perspective. While, most individuals were identified to genus only, six were identified as *S. alascanus* based on their size.

11. Phylum: Chordata

11.3. Class: Elasmobranchii – sharks, rays, & skates

11.3.1. Order: Carcharhiniformes



Credit: NOAA NWFSC/PIFSC AUV team
Photos: 20120724.165658.00783.jpg

Family Scyliorhinidae

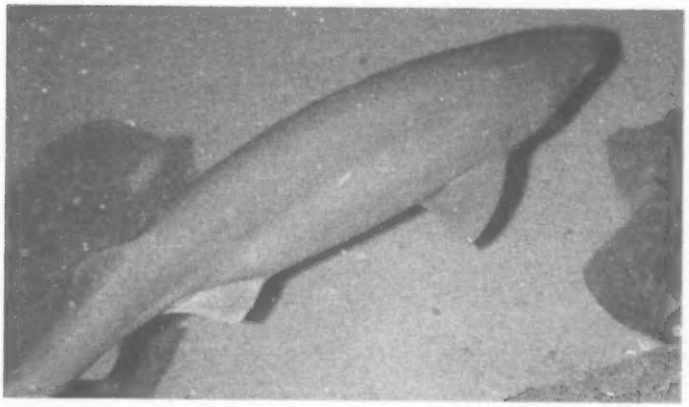
Apristurus brunneus
Brown cat shark

Authority: Gilbert 1892
Confidence: previously collected [3]

Transect: AUV_4
Depths (m): 883[1]

[1]Four other individuals from the family Scyliorhinidae were observed in AUV photos from transects AUV1 & 4, at depths (m) ranging from 648-817. One or more may be *A. kampae*.

11. Phylum: Chordata
11.3. Class: Elasmobranchii – sharks, rays, & skates
11.3.2. Order: Hexachiformes



Credit: DFO PBS ROV team
Photo (top): 072212_185541_ 267.jpg
Photo (lower): 072212_190255_ 296.jpg

Family Hexanchidae

Hexanchus griseus
Bluntnose sixgill shark

Authority: Bonnaterre 1788
Confidence: new record

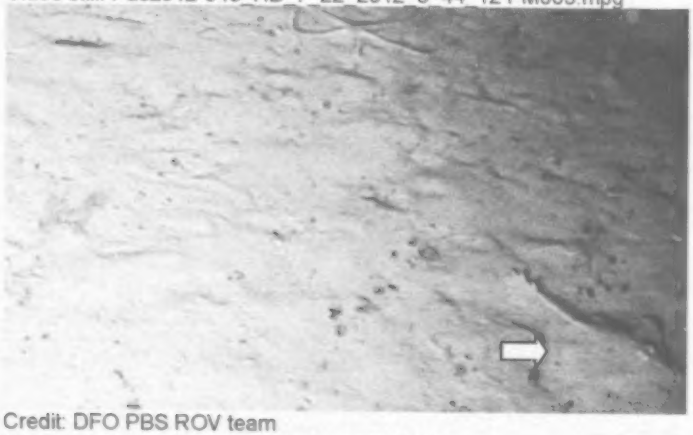
Transect: DFO_4
Depth (m): 185

11. Phylum: Chordata

11.3. Class: Elasmobranchii – sharks, rays, & skates

11.3.3. Order: Rajiformes

Credit: DFO PBS ROV team
Video still: Pac2012-043_HD_7_22_2012_5_44_12 PM003.mpg



Credit: DFO PBS ROV team
Video still (SFU ROV): 20120724-235523a04.mpg

Family Rajidae

Raja rhina
Longnose skate

Authority: Girard 1855
Confidence: new record but family previously observed [6][1]

Transcects: DFO_1 & 4; SFU_3
Depths (m): 196-242

[1]All three skates observed on Cobb Seamount in 2012 were juveniles, which can make identification more challenging.

Table 3. Benthic and mid-water taxa previously recorded as occurring on Cobb Seamount, but not observed in the 2012 survey. The absence of these 123 taxa in the 2012 species inventory is likely owing to a difference in depths surveyed and a difference in sampling techniques used (e.g. grabs, tows, and divers) and possibly different identifications (e.g. rockfish).

Phylum	Species (original nomenclature[1])	Source[2]
Chlorophyta		
	Acrochaete apiculata (*Pseudopringsheimia apiculata*)	1
Ochrophyta		
	Ectocarpus corticulatus	2
Rhodophyta		
	Antithamnion kylinii (*A. kylnii*)	2
	Ceramiun sp.	2
	Delesseria sp.	2
	Mastocarpus jardinii	2
	Polysiphonia pacifica	2
	Polysiphonia stricta (*P. urceolata*)	2
	Porphyropsis sp.	2
	Unknown red blade	2
Porifera		
	Esperiopsis cf *villosa*	6
	Lefroyella sp.	6
	cf *Mycale* (*Mycale*) *lingua*	6
	Phorbas sp. (*Merriamum* sp.)	6
Cnidaria		
	Antipathes sp.	6
	colonial zoanthids[3]	2
	Ptychogastria sp. (*Ptychogastris* sp.)	6
	Sertularella sp.	6
	Stylatula elongata	2,6
	Velella velella (*V. lata*)	1
Ctenophora		
	Beroë sp.	1
Annelida		
	Chitinopoma serrula (*C. groenlandica*)	1
	Cirratulidae sp.	2,6
	Crucigera irregularis	6
	Eunice kobiensis	1,6
	Euphrosine sp.	2,6
	Euphrosine bicirrata (*Euphrosyne bicirrata*)	1
	Euphrosine hortensis (*Euphrosyne hortensis*)	1
	Lepidonotus squamatus	6
	Lumbrineris sp. (*Lumbrinereis* sp.)	1,6
	Lumbrineris inflata	2
	Nereis procera	1
	Phyllodoce maculata	1
	Serpula vermicularis	1
	Spirorbinae sp. (Spirorbidae sp.)	6
	Trichobranchidae sp.	2,6
	Trypanosyllis aeolis (*T. gemmipara*)	1
Arthropoda		
	Calanoida copepod (Calanoid copepod)	2
	Caprella alaskana	2,6

Phylum	Species (original nomenclature[1])	Source[2]
	Caprella laeviuscula	2,6
	Cyclopoida copepod (Cyclopoid copepod)	2
	Gammaridae spp.	2,6
	Harpacticoida copepod (Harpacticoid copepod)	2
	Laniropsis tridens	2,6
	Lepas anatifera	1
	Leptochelia sp.	2,6
	Maera sp.	2,6
	Micropleustes sp.	2,6
	Munida quadrispina	7
	Munna chromatocephala	2,6
	Pandalopsis ampla	6
	Paralomis sp.	7
	Parapleustes sp.	2,6
	Paratanais sp.	2,6
	Proboloides sp.	2
	Uromunna ubiquita (*Munna ubiquita*)	2,6
Mollusca		7
	Barleeia/Cingula sp.	2,6
	Batillaria/Antiplanes sp. (*Battilaria/Antiplanes* sp.)	2
	Bittium sp.	2,6
	Chlamys behringiana	7
	Chlamys rubida	7
	Dirona albolineata	1
	Diodora aspera	2,6
	Doris odhneri (*Archidoris odhneri*)	1
	Epitonium sp.	6
	Granulina margaritula	2,6
	Hiatellidae sp. (Hiatellid sp.)	2,6
	Homalopoma luridum (*H. carpenter*)	1,6
	Limatula subauriculata	6
	Lirabuccinum dirum (*Searlesia dira*)	1,2,6
	Lottia instabilis (*Acmea instabilis*)	2,6
	Margarites helicinus (*M. beringensis*)	1
	Margarites olivaceus marginatus (*M. marginatus*)	6
	Macoma balthica	2,6
	Modiolus modiolus[4]	2
	Petricolaria pholadiformis (*Petricola pholadiformis*)	2,6
	Philobryid sp.	2,6
	Pleurotomaria sp.	6
	Solariella obscura	6
	Solemyid sp.	2
Brachipoda		
	Platidia hornii	2,6
	Terebratulina sp.	2,6
Bryozoa		
	Bicrisia edwardsiana	2,6
	Borgella pustulosa (*Borgiola pustulosa*)	1
	Bugula sp.	2,6
	Crisia sp. & *C. occidentalis*	1,2,6
	Filicrisia sp. & *F. franciscana* (*Felicrisia* sp.)	1, 2,6
	Lyrula sp.	2,6

Phylum	Species (original nomenclature[1])	Source[2]
	Rhamphostomella spinigera	1
Sipuncula		
	Phascolosoma agassizii	1,2,6
Echinodermata		
	cf *Dermasterias* sp.	6
	Nearchaster sp.	6
	Ophiacantha diplasia (*Ophiocantha diplasia*)	6
	Ophioscolex corynetes	6
	Poraniopsis inflatus	6
	Psolidium cf *bullatum*	
Chordata		
	Argyropelecus affinis	6
	Ascidia ceratodes	2,6
	Bathylagidae sp.	6
	Brama japonica	6
	Carcharodon carcharias[5]	-
	Chauliodus macouni	5
	Diaphus theta	5
	Lamna ditropis	3
	Lestidiops ringens	5
	Lycodapus sp.	6
	Myctophidae	5,6
	Mola mola	1,6
	Nannobrachium regale (*Lampanyctus regalis*)	5
	Prionace glauca	1,2,3
	Protomyctophum spp.	5
	Pseudopentaceros richardsoni	3
	Sebastes borealis	3
	Sebastes flavidus	3
	Sebastes jordani	3,4
	Sebastes melanops	3
	Sebastes paucispinis (*Sebastodes paucispinis*)	1,2,3,6
	Sebastes proriger	3
	skilfish[3] (likely *Erilepis zonifer*)	3
	Stenobrachius leucopsarus	5
	Tarletonbeania crenularis	5
	Trachipterus altivelis	5
	Trachurus symmetricus	3,6

[1]The nomenclature as it appears in the publication if, according to the World Register of Marine Species (WoRMS 2014), it has changed since.
[2]Source of record list: 1 = from Birkeland (1971), 2 = from Parker & Tunnicliffe (1994), 3 = from Douglas (2011), 4 = from Pearson et al. (1993), 5 = from Dower & Perry 2001, 6 = from an unpublished list compiled by V. Tunncliffe (from submersible dive observations, photographs, & submersible & dredging collections in the 1980s-90s), 7 = from Royal British Columbia Museum invertebrate archives (pers. comm. Heidi Gartner).
[3]Listed under common name in publication (scientific name not provided).
[4]Collection was of subfossil.
[5]Reported by safety divers at Cobb Seamount (Boyd 2005).

Acknowledgements

We gratefully thank all members of the Cobb Seamount 2012 cruise (PAC2012-043) for their participation and contributions to the success of this expedition. The DFO and NOAA science teams, the DFO PBS ROV team, the NOAA AUV team, The SFU ROV team, and the personnel of the CCGS *John P. Tully* all contributed to the collection of valuable video and still photographs and voucher specimens of benthic and mid-water species and habitat. Many colleagues assisted us with the development of this species inventory: we especially thank Verena Tunnicliffe for her valuable suggestions, help with identifications, and her unpublished data; the Royal British Columbia Museum for archiving the majority of Cobb Seamount voucher specimens; Henry Reiswig for sharing his taxonomic expertise in glass sponges; Katie Gale for reviewing the identification of sea stars; Jim Boutillier, Graham Gillespie, Heidi Gartner, and Tom Laidig for their constructive reviews of this report and sharing their taxonomic expertise; and James Pegg for the use and support of the Video Miner annotation software. The Cobb Seamount 2012 cruise, data analysis, and reporting were funded by the DFO International Governance Strategy program and NOAA's Deep Sea Coral Research and Technology Program and NOAA Fisheries' International Science Program.

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Images credited "DFO PBS ROV team" and "NOAA NWFSC/PIFSC AUV team" were collected during the 2012 expedition outlined in this guide.

DFO PBS ROV team – Fisheries and Oceans Canada Pacific Biological Station remotely operated vehicle team

NOAA NWFSC/PIFSC AUV team – National Oceanic and Atmospheric Administration Northwest Fisheries Science Center and Pacific Islands Fisheries Science Center autonomous underwater vehicle team

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SWFSC – Sorthwest Fisheries Science Center (Santa Cruz, CA)
NWFSC – Northwest Fisheries Science Center (Seattle, WA)
PIFSC – Pacific Islands Fisheries Science Center (Honolulu, HI)
SFU – Simon Fraser University (Vancouver, BC)
Memorial University (St. John's, NL)
University of Victoria (Victoria, BC)

2012 Cruise Taxonomic Checklist

Classification of the 144 organisms observed as occurring on Cobb Seamount during the 2012 cruise (from 11 phyla).

Phylum: Ochrophyta
Class: Phaeophyceae
Order: Desmarestiales
Desmarestia viridis

Phylum: Rhodophyta
Class: Florideophyceae
Order: Ceramiales
Polysiphonia spp.
Order: Corallinales
cf *Lithophyllum* spp.
cf *Lithothamnion* spp.

Phylum: Porifera
Class: Hexactinellida
Order: Hexactinosida
Farrea omniclavata sp. nov.
Pinulasma fistulosom
Order: Lyssacinosida
Acanthascus spp.
Bathydorus sp.
Rhabdocalyptus spp.
Staurocalyptus spp.

Class: Demospongiae
Demospongiae sp. 1
Demospongiae sp. 2
Demospongiae sp. 3
Order: Astrophorida
Poecillastra sp.
Order: Hadromerida
Polymastia sp.
Order: Halichondria
cf *Auletta* sp.
Halichondria panicea
Order: Poecilosclerida
cf *Acarnus erithacus*
Latrunculia (*Biannulata*) *oparinae*

Phylum: Cnidaria
Class: Anthozoa
Order: Actiniaria
Actiniaria sp. 1
Actiniaria sp. 2
Actiniaria sp. 3
Cribrinopsis fernaldi
cf Hormathiidae sp.
Metridium senile
Stomphia didemon
Urticina crassicornis
Order: Alcyonacea
Gersemia sp.
Heteropolypus ritteri
Isidella sp.
Keratoisis sp.
Lepidisis sp.
Narella sp.
Paragorgia sp.
Plumarella superba
Primnoa cf *pacifica*
Swiftia simplex
Order: Antipatharia
Antipatharia sp.
Bathypathes sp.
Lillipathes cf *lillei*
Parantipathes sp.
Stichopathes sp.
Order: Corallimorpharia
Corynactis californica
Order: Pennatulacea
Anthoptilum spp.
Halipteris willemoesi
Umbellula lindahli
Order: Scleractinia
Desmophyllum dianthus
Lophelia pertusa
Order: Zoantharia
Epizoanthus sp.

Class: Hydrozoa

Hydroid sp. 1
Hydroid sp. 2

Order: Anthoathecata
Stylaster spp.
Order: Leptothecata
cf *Obelia* spp.

Phylum: Annelida
Class: Polychaeta
Order: Eunicida
Nothria conchylega
Order: Sabellida
Crucigera zygophora
Paradexiospira sp.
Protula pacifica
Order: Spionida
Phyllochaetopterus prolifica
Spiochaetopterus cf *costarum*

Phylum: Anthropoda
Class: Malacostraca
Order: Amphipoda
Caprella sp.
Order: Decapoda
Chionoecetes tanneri
Chirostylidae sp.
Chorilia longipes
Elassochirus cavimanus
Lithodes couesi
Oregonia gracilis
Pagurus kennerlyi

Phylum: Mollusca
Class: Bivalvia
Order: Pectinoida
Crassadoma gigantea

Class: Cephalopoda
Order: Octopoda
Graneledone boreopacifica
Octopodidae sp.

Class: Gastropoda
Order: Archaeogastropoda
Calliostoma annulatum
Calliostoma ligatum
Order: Neogastropoda
Fusitriton oregonensis
Ocinebrina lurida
Order: Nudibranchia
Doris montereyensis
Tritoniidae sp.

Class: Polyplacophora
Order: Lepidopleurida
Leptochiton rugatus

Phylum: Brachiopoda
Class: Rhynchonellata
Order: Terebratulida
Laqueus californianus

Phylum: Bryozoa
Bryozoa sp.
Class: Gymnolaemata
Order: Cheilostomatida
cf *Reginella hippocrepis*

Class: Stenolaemata
Order: Cyclostomatida
Disporella separata

Phylum: Echinodermata
Class: Asteroidea
Asteroidea sp.
Order: Brisingida
Brisingidae sp.
Order: Forcipulatida
Ampheraster sp.
Leptasterias hexactis
Orthasterias koehleri
Pycnopodia helianthoides
Rathbunaster californicus
Stylasterias forreri
Order: Paxillosida
Pseudarchaster sp.
Thrissacanthias sp.
Order: Spinulosida
Henricia leviuscula
Henricia sanguinolenta
Order: Valvatida

Ceramaster patagonicus
Ceramaster cf *stellatus*
Crossaster papposus
Hippasteria phrygiana
Lophaster furcilliger
Solaster cf *endeca*
Solaster stimpsoni
Order: Velatida
Pteraster sp.

Class: Crinoidae
Order: Comatulida
Florometra serratissima

Class: Echinoidea
Order: Camarodonta
Mesocentrotus franciscanus
Strongylocentrotus pallidus

Class: Holothuroidea
Order: Aspidochirotida
Apostichopus leukothele
Molpadia sp.
Order: Dendrochirotida
Psolus squamatus
Order: Elasipodida
Pannychia cf *moseleyi*

Class: Ophiuroidea
Order: Euryalida
Asteronyx loveni
Order: Ophiurida
Ophiopholis bakeri
Ophiura sarsii

Phylum: Chordata
Class: Ascidiacea
Ascidiacea sp.

Class: Actinopterygii
Order: Gadiformes
Antimora microlepis
cf *Coryphaenoides acrolepis*

Order: Perciformes
Chirolophis decoratus
Order: Pleuronectiformes
Citharichthys sordidus
Embassichthys bathybius
Glyptocephalus zachirus
Lepidopsetta bilineata
Microstomus pacificus
Order: Scorpaeniformes
Agonopsis vulsa
Anoplopoma fimbria
Cottidae sp.
Hemilepidotus spinosus
Paricelinus hopliticus
Rhamphocottus richardsonii
Sebastes spp.
Sebastes aleutianus
Sebastes alutus
Sebastes elongatus
Sebastes emphaeus
Sebastes entomelas
Sebastes helvomaculatus
Sebastes melanostictus
Sebastes melanostomus
Sebastes mystinus
Sebastes rosaceus
Sebastes ruberrimus
Sebastes variegatus
Sebastes wilsoni
Sebastes zacentrus
Sebastolobus spp.

Class: Elasmobranchii
Order: Carcharhiniformes
Apristurus brunneus
Order: Hexachiformes
Hexanchus griseus
Order: Rajiformes
Raja rhina

Summary Taxonomic Checklist

Classification of all 267 benthic and mid-water organisms observed as occurring on Cobb Seamount (2012 cruise taxa plus the additional taxa in Table 3; from 14 phyla).

***Phylum:* Chlorophyta**
Class: Ulvophyceae
Order Ulvales
Acrochaete apiculata

Phylum: Ochrophyta
Class: Phaeophyceae
Order: Desmarestiales
Desmarestia viridis
Order: Ectocarpales
Ectocarpus corticulatus

Phylum: Rhodophyta
Unknown red blade
Class: Compsopogonophyceae
Order: Erythropeltidales
Porphyropsis sp.

Class: Florideophyceae
Order: Ceramiales
Antithamnion kylinii
Ceramiun sp.
Delesseria sp.
Polysiphonia spp.
Polysiphonia pacifica
Polysiphonia stricta
Order: Corallinales
cf *Lithophyllum* spp.
cf *Lithothamnion* spp.
Order: Gigartinales
Mastocarpus jardinii

Phylum: Porifera
Class: Hexactinellida sponges
Order: Hexactinosida
Farrea omniclavata sp. nov.
Lefroyella sp.
Pinulasma fistulosom
Order: Lyssacinosida
Acanthascus spp.
Bathydorus sp.
Rhabdocalyptus spp.
Staurocalyptus spp.

Class: Demospongiae
Demospongiae sp. 1
Demospongiae sp. 2
Demospongiae sp. 3
Order: Astrophorida
Poecillastra sp.
Order: Hadromerida
Polymastia sp.
Order: Halichondria
cf *Auletta* sp.
Halichondria panicea
Order: Poecilosclerida
cf *Acarnus erithacus*
Esperiopsis cf *villosa*
Latrunculia (*Biannulata*) *oparinae*
cf *Mycale* (*Mycale*) *lingua*
Phorbas sp.

Phylum: Cnidaria
Class: Anthozoa
Order: Actiniaria
Actiniaria sp. 1
Actiniaria sp. 2
Actiniaria sp. 3
Cribrinopsis fernaldi
cf Hormathiidae
Metridium senile
Stomphia didemon
Urticina crassicornis
Order: Alcyonacea
Gersemia sp.
Heteropolypus ritteri
Isidella sp.
Keratoisis sp.
Lepidisis sp.
Narella sp.

Paragorgia sp.
Plumarella superba
Primnoa cf *pacifica*
Swiftia simplex
Order: Antipatharia
Antipatharia sp.
Bathypathes sp.
Lillipathes cf *lillei*
Parantipathes sp.
Stichopathes sp.
Order: Corallimorpharia
Corynactis californica
Order: Pennatulacea
Anthoptilum spp.
Halipteris willemoesi
Stylatula elongata
Umbellula lindahli
Order: Scleractinia
Desmophyllum dianthus
Lophelia pertusa
Order: Zoantharia
Epizoanthus sp.
zoanthids

Class: Hydrozoa
Hydroid sp. 1
Hydroid sp. 2
Order: Anthoathecata
Stylaster spp.
Velella velella
Order: Leptothecata
cf *Obelia* spp.
Sertularella sp.
Order: Trachymedusae
Ptychogastria sp.

Phylum: Ctenophora
Class: Nuda
Order: Beroida
Beroë sp.

Phylum: Annelida
Class: Polychaeta
Order: Amphinomida
Euphrosine sp.
Euphrosine bicirrata
Euphrosine hortensis
Maera sp.
Micropleustes sp.
Parapleustes sp.
Proboloides sp.
Order: Eunicida
Eunice kobiensis
Lumbrineris sp.
Lumbrineris inflata
Nothria conchylega
Order: Phyllodocida
Lepidonotus squamatus
Nereis procera
Phyllodoce maculata
Trypanosyllis aeolis
Order: Sabellida
Chitinopoma serrula
Crucigera irregularis
Crucigera zygophora
Paradexiospira sp.
Protula pacifica
Serpula vermicularis
Spirorbinae sp.
Order: Spionida
Phyllochaetopterus prolifica
Spiochaetopterus cf *costarum*
Order: Terebellida
Cirratulidae sp.
Trichobranchidae sp.

Phylum: Arthropoda
Class: Malacostraca
Order: Amphipoda
Caprella sp.
Caprella alaskana
Caprella laeviuscula
Gammaridae spp.
Order: Decapoda
Chionoecetes tanneri
Chirostylidae sp.
Chorilia longipes
Elassochirus cavimanus
Lithodes couesi
Munida quadrispina
Oregonia gracilis
Pagurus kennerlyi
Pandalopsis ampla
Paralomis sp.
Order: Isopoda
Ianiropsis tridens
Munna chromatocephala

Uromunna ubiquita

Order: Tanaidacea
Leptochelia sp.
Paratanais sp.

Class: Maxilopoda
Order: Calanoida
Calanoida copepod
Order: Cyclopoida
Cyclopoida copepod
Order: Harpacticoida
Harpacticoida copepod
Order: Lepadiformes
Lepas anatifera

Phylum: Mollusca
Class: Bivalvia
Order: Arcoida
Philobryid sp.
Solemyid sp.
Order: Limoida
Limatula subauriculata
Order: Mytiloida
Modiolus modiolus
Order: Pectinoida
Chlamys behringiana
Chlamys rubida
Crassadoma gigantea
Hiatellidae sp.
Order: Veneroida
Macoma balthica
Petricolaria pholadiformis

Class: Cephalopoda
Order: Octopoda
Graneledone boreopacifica
Octopodidae sp.

Class: Gastropoda
Diodora aspera
Homalopoma luridum
Lottia instabilis
Margarites helicinus
Margarites olivaceus marginatus
Pleurotomaria sp.
Solariella obscura
Order: Archaeogastropoda
Calliostoma annulatum
Calliostoma ligatum
Order: Caenpgastropoda
Batillaria/Antiplanes sp.
Bittium sp.
Epitonium sp.
Order: Littorinimorpha
Barleeia/Cingula sp.
Order: Neogastropoda
Fusitriton oregonensis
Granulina margaritula
Ocinebrina lurida
Order: Nudibranchia
Dirona albolineata
Doris odhneri
Doris montereyensis
Lirabuccinum dirum
Tritoniidae sp.

Class: Polyplacophora
Order: Lepidopleurida
Leptochiton rugatus

Phylum: Brachiopoda
Class: Rhynchonellata
Order: Terebratulida
Laqueus californianus
Platidia hornii
Terebratulina sp.

Phylum: Bryozoa
Bryozoa sp.
Class: Gymnolaemata
Order: Cheilostomatida
Lyrula sp.
cf *Reginella hippocrepis*
Rhamphostomella spinigera

Class: Stenolaemata
Order: Cyclostomatida
Bicrisia edwardsiana
Borgella pustulosa
Bugula sp.
Crisia sp.
Crisia occidentalis
Disporella separata
Filicrisia sp.
Filicrisia franciscana

Phylum: Sipuncula
Class: Phascolosomatidea
Order: Phascolosomatida
Phascolosoma agassizii

Phylum: Echinodermata
Class: Asteroidea
Asteroidea sp.
Order: Brisingida
Brisingidae sp.
Order: Forcipulatida
Ampheraster sp.
Leptasterias hexactis
Orthasterias koehleri
Pycnopodia helianthoides
Rathbunaster californicus
Stylasterias forreri
Order: Notomyotida
Nearchaster sp.
Order: Paxillosida
Pseudarchaster sp.
Thrissacanthias sp.
Order: Spinulosida
Henricia leviuscula
Henricia sanguinolenta
Order: Valvatida
Ceramaster patagonicus
Ceramaster cf *stellatus*
Crossaster papposus
cf *Dermasterias* sp.
Hippasteria phrygiana
Lophaster furcilliger
Poraniopsis inflatus
Solaster cf *endeca*
Solaster stimpsoni
Order: Velatida
Pteraster sp.

Class: Crinoidae
Order: Comatulida
Florometra serratissima

Class: Echinoidea
Order: Camarodonta
Mesocentrotus franciscanus
Strongylocentrotus pallidus

Class: Holothuroidea
Order: Aspidochirotida
Apostichopus leukothele
Molpadia sp.
Order: Dendrochirotida
Psolus squamatus
Order: Elasipodida
Pannychia cf *moseleyi*

Class: Ophiuroidea
Order: Euryalida
Asteronyx loveni
Order: Ophiurida
Ophiacantha diplasia
Ophiopholis bakeri
Ophioscolex corynetes
Ophiura sarsii
Order: Elasipodida
Psolidium cf *bullatum*

Phylum: Chordata
Class: Ascidiacea
Ascidiacea sp.
Order: Phlebobranchia
Ascidia ceratodes

Class: Actinopterygii
Order: Aulopiformes
Lestidiops ringens
Order: Gadiformes
Antimora microlepis
cf *Coryphaenoides acrolepis*
Order: Lampriformes
Trachipterus altivelis
Order: Myctophiformes
Diaphus theta
Myctophidae
Nannobrachium regale
Protomyctophum spp.
Stenobrachius leucopsarus
Tarletonbeania crenularis
Order: Osmeriformes
Bathylagidae sp.
Order: Perciformes
Brama japonica
Chirolophis decoratus
Lycodapus sp.
Pseudopentaceros richardsoni
Trachurus symmetricus
Order: Pleuronectiformes

Citharichthys sordidus
Embassichthys bathybius
Glyptocephalus zachirus
Lepidopsetta bilineata
Microstomus pacificus
Order: Scorpaeniformes
Agonopsis vulsa
Anoplopoma fimbria
Cottidae sp.
Enlepis zonifer
Hemilepidotus spinosus
Paricelinus hopliticus
Rhamphocottus richardsonii
Sebastes spp.
Sebastes aleutianus
Sebastes alutus
Sebastes borealis
Sebastes elongatus
Sebastes emphaeus
Sebastes entomelas
Sebastes flavidus
Sebastes helvomaculatus
Sebastes jordani
Sebastes melanops
Sebastes melanostictus
Sebastes melanostomus
Sebastes mystinus
Sebastes paucispinis
Sebastes proriger
Sebastes rosaceus
Sebastes ruberrimus
Sebastes variegatus
Sebastes wilsoni
Sebastes zacentrus
Sebastolobus spp.
Order: Stomiiformes
Argyropelecus affinis
Chauliodus macouni
Order: Tetradontiformes
Mola mola

Class: Elasmobranchii
Order: Carcharhiniformes
Apristurus brunneus
Prionace glauca
Order: Hexachiformes
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Order: Lamniformes
Carcharodon carcharias
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